Response to Public Comment Received by the State of Montana for the Butte Priority Soils Operable Unit Consent Decree

Prepared by:

Montana Department of Environmental Quality

Natural Resource Damage Program
Montana Department of Justice

September 19, 2020

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Section I: Introduction

The State of Montana, through the Department of Environmental Quality (DEQ) solicited public comments for a thirty-day period from June 15, 2020 to July 14, 2020, as required by Section 713 of the Montana Comprehensive Cleanup and Responsibility Act (CECRA), Montana Code Annotated (MCA) Section 75-10-713. Numerous members of the public submitted comments, both in support of and raising concerns with the Consent Decree (CD) for the Butte Priority Soils Operable Unit (BPSOU). Many of the comments the State received mirrored comments that were also submitted to the United States during the concurrent public comment period of the United States. Additionally, many of the concerns raised in the comments to the Consent Decree were raised during the United States' public comment period and response to comments for the 2020 Amendment to the BPSOU Record of Decision (April 11 2019 to July 11, 2019)

The State considered all comments received, which included comments that raised concerns with issues outside the scope of the CERCLA remedial actions that this Consent Decree requires; and, requested remedies that EPA, in consultation with DEQ, has already considered and properly rejected as impracticable, outside the scope of EPA's remedial authority, or not supported by its analysis of the data related to the BPSOU. All received public comments are provided in full in Attachment A. In this response to public comments, similar comments are categorized together, summarized, and answered overall, with specific responses to comments as needed. Through consideration of all public comments, the State has determined there is no justification for modifying the Consent Decree.

Section II: Comment Summary and Response by Category

Category A: Use of Railroad Figure within the BPSOU CD.

Summary: Commenter (Commenter No. 3) requested that the CD be modified as it (a) is imprecise as to the definitions and descriptions of railroad properties, and (b) misstates the amount of contamination associated with or coming from the railroad properties.

Response: The State position echoes the United States response to this comment provided in the Motion to Enter—the definition of the railroad properties is for illustrative purposes only. The commenter submitted a comment requesting the Consent Decree be modified. The Consent Decree excludes certain sections within the BPSOU owned by BNSF Railway Company and Union Pacific Railroad (the "Railroad Properties"), which the governments intend to address in a separate action. The Railroad Companies raise issues with how the Railroad Properties are defined, and the summary of industrial history within the BPSOU. Commenter 3 at page 2. According to the Commenter, the Consent Decree is imprecise in defining the boundaries of the Railroad Properties. Commenter 3, at page 2. However, the definition of the Railroad Properties explicitly states that the boundaries shown are "for illustrative purposes only." Consent Decree, at 28. The boundaries are further described in figures in Appendix F of the Consent Decree, which—as the comment itself quoted—"are not intended to precisely define the boundaries of the Railroad Properties." Such language sufficiently addresses the Commenter's concerns, and adding more language to that effect would be duplicative.

The Commenter also asserts that Recital Section L of the Consent Decree overstates the amount of pollution on, or originating from, the Railroad Properties. Commenter 3, at pages 2–10. The comment notes that there has been some pollution on the Railroad Properties. Commenter 3, at page 6. The Commenter's calculations of their pollution contribution in their comment letter are disputed by Atlantic Richfield and other parties. The Consent Decree does not, in any way, attempt to quantify the contributions from the Railroad Properties. This action does not concern liability for the Railroad Properties, and need not be altered based on the concerns raised by the Railroad Companies.

Category B: Air Monitoring

Summary: The CD should be modified to require additional air monitoring.

Response: The State received comments from an interested community group regarding the need for additional air monitoring (Commenter No. 2), which were very similar to comments received on the proposed plan for the amended BPSOU Record of Decision. Air monitoring will be a requirement during remedial actions that involve dust generating activities, such as earth work associated with removal of historic mine waste, construction of stormwater basins, and other heavy construction actions necessary to construct the remedial elements. Without remedial construction activities that may generate dust, the air exposure pathway for contaminants of concern does not present excess risk.

Of note, other activities in Butte do generate dust and these are collectively monitored through an active air monitoring program coordinated between Butte Silver Bow County and the State of Montana. The Butte-Silver Bow County Health Department and Montana DEQ Air Quality Division have an ongoing air quality monitoring program for the Butte-Silver Bow Air Quality District. Particulate monitoring is conducted at the air quality station located next to the Greeley School and includes:

- Continuous monitoring for PM 2.5 particulate concentrations using a Met One model 1020 Beta Attenuation Monitor (BAM-1020).
- Continuous monitoring for PM 10 particulate concentrations using a Met One model 1020 Beta Attenuation Monitor (BAM-1020).
- Episodic monitoring for PM 2.5 using three filter-based particulate samplers (BGI Model PQ-200, Met One SASS sampler, URG sampler). These samplers collect particulate matter on filters over 24-hour

periods. The filters are then analyzed gravimetrically to determine the average airborne PM2.5 concentration during the sample period. The filters are analyzed by a laboratory for selected contaminants of concern. The episodic sampling is performed every 6 days, concurrent with EPA's guidance.

- A meteorological instrumentation tower that measures wind speed, wind direction, and temperature.
- SASS samplers that are regularly analyzed for concentrations of arsenic, cadmium, copper, lead, and zinc. In addition to the metal concentrations analyses, chemical speciation analyses will be completed.

Category C: Residential Lead Cleanup Levels

Summary: The lead cleanup levels required by the CD are inadequate. The CD should be modified to provide a more protective lead cleanup level. Commenter thought the lead action level is too high—higher than the action levels for lead in other parts of the country and the Anaconda Smelter Site—and that it impacted human health in Butte.

Response: The State received a comment (Commenter No. 8) asserting that the Consent Decree does not adequately address lead contamination in residential areas within Butte. However, the Consent Decree expressly does not address remediation within residential areas. Consent Decree, at 29 ("Remedial action to address such residential exposure is implemented, as of the Effective Date, through the Residential Metals Abatement Program ("RMAP") on residential properties."); Consent Decree, at 30 ("The ROD, as defined for purposes of this Consent Decree only, does not include Residential Solid Media Remedial Action."). Residential cleanup will be addressed by the Defendants under a separate EPA enforcement mechanism, known as an amended Unilateral Administrative Order, and the public will have input into the final terms of the residential cleanup plan. Further, EPA will consult with DEQ in the review and revision to any RMAP documents and plans that are submitted under the UAO. Therefore, such concerns are beyond the scope of this Consent Decree, and will be addressed through the RMAP. The State does, however, support the eventual inclusion of such remedy measures in a Consent Decree.

Category D: Technical Impracticability Waiver of State water quality standards

Summary: Commenter 4 accepts the up-front technical impracticability waiver from the State's total recoverable surface water quality standards to the federal dissolved surface water quality standards for copper and zinc, but opposes the contingent waivers of the waived-to dissolved standards for copper and zinc and the contingent waivers for additional contaminants if there is more than one exceedance of the water quality standard in a 3-year period. Finally, Commenter 4 objected to the potential use of the biotic ligand model as the basis for a future waived-to standard for copper and zinc. The commenter stated that the biotic ligand model should not be used in non-equilibrium conditions such as acute or stormwater flows and that this sets a bad precedent for other waterways in the state. Commenter 1 also expressed concern about future waivers.

Response: The Consent Decree provides for certain up-front and contingent waivers of surface water quality standards. See Consent Decree, Attachment A to Appendix D. It does not change state water quality standards applicable to the discharge of treated ground water, as one commenter claims.

The State received a comment (Commenter 4) correctly noting that such waivers are not commonly used in CERCLA remedial decisions or consent decrees. An additional commenter noted, "concern that the Consent Decree allows for potential 'further waivers' of water quality standards down the road, if the remedy as proposed fails to meet the Federal 'replacement standards' which will protect fish and aquatic life." (Commenter 1, at pages 1-2). The State, after thorough review of the modeling efforts conducted to assess the appropriateness of potential waiver of state water quality standards, as well as a review of the remedy as modified by the 2020 Amendment to the BPSOU ROD, concurs that waivers are justified by site-specific circumstances. CERCLA allows waiver of applicable or relevant and appropriate requirements ("ARARs") if

such requirements are "technically impracticable from an engineering perspective." 42 U.S.C. § 9621(d)(4)(C). The city of Butte is the site of extensive historical mining, which has distributed mining waste-related hazardous substances throughout the city, including upstream sources of contamination. The northern portion of the city of Butte is also located on a hill. These circumstances create unique challenges for implementing a protective remedy within the BPSOU.

The EPA, in consultation with DEQ, has conducted extensive analysis of the area, including detailed modeling (EPA. 2019a. Surface Water Technical Impracticability Evaluation Report. Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site). The 2019 BPSOU TI Evaluation Report concludes that the acute total recoverable copper and zinc standards will not be met in the BPSOU surface water bodies even with the construction of stormwater controls in every drainage basin within the BPSOU. This is due to the large quantities of stormwater and the limited capacity of the creeks to incorporate the contaminant load, the large areal extent of the contaminant distribution, and the surface water of Blacktail Creek coming into the BPSOU from upstream areas that introduce water already over the state surface water standards.

There are, however, several other remedial actions required in the Consent Decree that will address other contaminant pathways to the creeks. First, all contaminated instream sediments within the project areas of Blacktail and Silver Bow Creek below the confluence will be removed and replaced with clean instream sediments. Second, contaminated groundwater currently discharging to Blacktail Creek and Silver Bow Creek below the confluence will be captured before it discharges to the creeks and recontaminates instream sediments and surface water. Because of these remedial requirements to address these current contaminant pathways that impact surface water quality and the TI evaluation conclusions, surface water standards for copper and zinc have therefore been waived up front, as the comment noted without objection. EPA's analysis also demonstrated uncertainty as to whether certain other surface standards – namely, chronic aquatic copper and lead, and acute cadmium, copper, lead, silver, and zinc – could be met. EPA, in consultation with DEQ, nevertheless determined that the best course of action would be to pursue the surface water remedy portion of the BPSOU selected remedy. Rather than waiving the substitute standards up front, EPA provided for remediation to attempt to meet these standards and testing to evaluate the efficacy of the remediation. Because it remains unclear whether it is still possible to meet the standards, the EPA also provided contingency waivers for certain surface water contaminants. The EPA and DEQ retain the ability to require certain additional work before the contingency waiver is granted. All work will be subject to EPA oversight with DEQ consultation. This setup ensures that thorough remediation work takes place, while allowing for a further waiver of water quality standards if it becomes apparent that it is still impracticable to meet the waived-to surface water standards despite this work.

The commenter also raises issues dealing with the EPA's use of the Biotic Ligand Model ("BLM") for one of the contingent water quality standards. BLM is a promulgated Federal water quality criteria, issued by the EPA in 2007, and involves the use of several different data parameters and mathematical equations to derive a surface water quality standard that is applicable when contaminated instream sediments are not present. 72 Fed. Reg. 7983 (Feb. 22, 2007). As noted above, the selected remedy requires removal of contaminated instream sediments and contaminated groundwater controls and monitoring of the sediments to ensure that the instream sediments do not become recontaminated. The EPA and the State are aware of potential complications and the inability to accurately calculate a protective surface water criteria involved with the use of the BLM during non-equilibrium conditions such as acute or stormwater flows as noted by the commenter. Nevertheless, the EPA has promulgated this criterion for use in establishing surface water quality requirements for chronic or non-storm flow conditions. The EPA is confident that it can apply the BLM in a site-specific way to ensure that accurate, reliable, and protective water quality standards are chosen for copper, should the contingent waiver be applied.1 The commenter incorrectly asserts that the BLM standard will be used for zinc should the contingency waiver be invoked. The replacement standard for

[1] The 2020 Amendment to the BPSOU Record of Decision, at Table 2, footnote g, states the following: For acute conditions (wet weather events), the BLM standard or any other appropriate EPA-approved methodology that will perform in non-equilibrium conditions such as storm water or diel pH cycling shall be used.

zinc in that case is the EPA-promulgated standard in place at the time the contingency is invoked. This would likely be some form of a dissolved standard, not a BLM-calculated standard.

Category E: Clean-up of Silver Bow Creek above its confluence with Blacktail Creek

Summary of Comment regarding legal status of this section of Silver Bow Creek: The State received one comment (Commenter 5) specifically asking for a response to continued concern over the legal status of Silver Bow Creek above its confluence with Blacktail Creek, as well as the State's alleged disregard for the decision in the case Silver Bow Creek Headwaters Coalition LLC v. State of Montana. The State provides that response here:

Response: The State received comments regarding the stretch of Silver Bow Creek above its confluence with Blacktail Creek. The concerns raised in this comment were similar to the concerns raised to EPA during the public comment process associated with the Proposed Plan that preceded the 2020 Amendment to the BPSOU ROD. In 2015, a state district court found that the official geographic name for the drainage above the confluence of Silver Bow Creek and Blacktail Creek under Montana law is Silver Bow Creek. See Silver Bow Creek Headwaters Coalition v. State of Montana DV-10-431. Prior to the ruling, EPA and other federal, state, and local authorities had referred to the drainage as the Metro Storm Drain because it gathered and conveyed stormwater. The perennial water flow that composed Silver Bow Creek before mining activity is now intercepted by the Yankee Doodle Tailings Dam, the Berkeley Pit, and Montana Resources, LLP's permitted active mine area. The court ruled that the use of the term "Metro Storm Drain" as opposed to "Silver Bow Creek" did not follow the geographic naming statutes that governed official names of geographic areas in Montana. The State respects the court's ruling in that case. Since the court issued its ruling, the State has described the area in question as Silver Bow Creek above the confluence with Blacktail Creek or upper Silver Bow Creek in Superfund documents. The court's ruling, however, did not determine that the drainage in question was subject to state water quality standards. The district court's decision was narrow and limited to the proper name for the drainage, which the court stated was the only issue raised in the plaintiff's complaint in the matter. As the court's decision states, issues related to the cleanup obligations or water quality standards in this area "are of little significance to the issue at hand." Therefore, the court's ruling does not require a replacement creek be constructed in the area above the confluence of Silver Bow Creek and Blacktail Creek.

The relevant and current Montana DEQ regulation concerning this stretch of Silver Bow Creek is found at Administrative Rules of the State of Montana (or ARM) Section 17.30.607(1)(a)(iii), which states that "the concentrator pond and Silver Bow Creek drainage from this pond downstream to Blacktail Creek . . . have no classification." The same regulation prescribes water quality standards for Silver Bow Creek downstream from its confluence with Blacktail Creek.

Summary of Comments regarding the Silver Bow Creek above the Confluence Channel Replacement and the Request for a Memorandum of Understanding: Commenters (Commenters 5 and 6) supported entry of the Consent Decree, but noted that the lack of a replacement or reconstructed Silver Bow Creek above its confluence with Blacktail creek is a shortcoming of the Consent Decree because it "commits the existing Silver Bow Creek channel to be used for collecting contaminated stormwater." (See, especially, the request that the CD be amended by "replacing the current channel with the lined one proposed in ROCC's plans and then legally assigning that new one the name of our creek." Commenter 6 at page 3). The community still expects that leaders within Butte Silver Bow County and the State will ensure a creek project moves forward. Such a commitment between the government of Butte Silver Bow County and the State of Montana must be reflected in a Memorandum of Understanding. Further, all parties to the Consent Decree must account for the eventual creek work, thus ensuring cost savings for that future project (Commenter 6 at page 2).

Response: The State appreciates the dedication of and comments from the community on the issue of Silver Bow Creek above its confluence with Blacktail Creek. The State has engaged with the community in parallel with Consent Decree negotiations to craft both the Consent Decree and a Memorandum of

Understanding (MOU) between the State and Butte Silver Bow County to address the community concerns around Silver Bow Creek above its confluence with Blacktail Creek. The MOU is pending before the Butte Silver Bow Commissioners for their consideration. The State has committed, in both the Consent Decree (see paragraph 20 of the Consent Decree) and a pending separate MOU (attachment B to this responsiveness summary) with Butte-Silver Bow County to use any of its remaining settlement funds after completion of the Blacktail Creek Riparian Actions to replenish Natural Resource Damage Program (NRDP) funds used to address the Parrot Project, as well as providing $1 million dollars as seed money to be used for the future lined Silver Bow Creek channel above its confluence with Blacktail Creek. As noted in the pending MOU, the State anticipates that less than half of the $20.5 settlement dollars to the State will be used for the State's performance of the Blacktail Creek Riparian Actions. The balance of those funds will be used, then, to replenish NRDP funds used to address the Parrot Tailings removal, as well as provide $1 million to address a future lined creek channel in the Silver Bow Creek corridor upstream from Blacktail Creek. Such funds would be used as a match for other funds secured by the project proponent if land, water, access, infrastructure, and other issues are resolved at the time a proposed project is presented.

Further, the end land use plan (see Addendum 1 to Attachment C to Appendix D of the CD) and the necessary remedial components that will be constructed in the corridor will include areas that could support a future lined creek channel. (The creek channel would be lined to prevent the surface water in the creek from infiltrating and impacting Atlantic Richfield's groundwater remedy by altering the local groundwater hydrology and/or mobilizing arsenic and metals from the underlying contaminated soils and further impacting the groundwater.)

Although the State does not support the request of Commenter 6 to amend the Consent Decree to provide for a newly constructed channel, the State nevertheless supports these efforts towards a lined channel, both through the CD's allowance of using State settlement funds to support such work, as well as the State's commitment in the pending MOU to set aside $1 million for such efforts.

Category F: The Parrot Tailings Waste Removal Project Should be Performed as Part of Remedy

Summary: Commenter 1 was generally in favor of the consent decree, but stated that remedy should have paid for the Parrot Tailings Waste Removal Project rather than the State funding the Parrot Project.

Response: The State and EPA have had an impasse on whether the Parrot Tailings should be addressed under remedy since at least 2006 (see 2020 Amendment to the BPSOU ROD Response 2.15.2). In determining to proceed with the Parrot Project as restoration, the Governor concluded this impasse was an obstacle to getting the cleanup done in Butte, and the State's action to remove the Parrot Tailings would avoid this impasse and facilitate the BPSOU negotiations moving forward more quickly. Accordingly, addressing the Parrot Project under the State's natural resource damage authorities is an important part of finalizing the consent decree.

Although we don't know exactly how much money will be available, the State anticipates that at least half of the $20.5M will be available for reimbursement of the Parrot funds following completion of the Blacktail Creek work. As stated in the 2020 Amendment to the BPSOU ROD, EPA and DEQ have committed to cooperate and coordinate during the Blacktail Creek construction work to efficiently conduct the Blacktail Creek work and maximize the remainder funds that will be used to pay for the Parrot Project.

Additionally, as noted in the September 2019 Parrot Funding Restoration Plan Amendments, DEQ will be submitting a request to EPA to transfer $5,000,000 in funds obtained under a consent decree known as the Streamside Tailings Operable Unit Consent Decree. EPA will need to agree with the State that the funds obtained under that consent decree are no longer needed to complete the remedy for the Streamside Tailings Operable Unit; the consent decree provides that any unneeded funds revert back to the Natural Resource Damage Program. The State believes that sufficient funds will remain in the Streamside Tailings account following this transfer to address the long-term operations and maintenance of the Streamside Tailings remedy. These transferred funds will be used to backfill funds used to pay for the Parrot Project, if approved.

Category G: Butte Silver Bow has played a key role in community engagement.

Summary: Butte Silver Bow County has shown a great commitment to the public comment process and community engagement prior to its decision to sign the Consent Decree.

Response: The State appreciates and is grateful for the community outreach and engagement efforts undertaken by Butte Silver Bow County. Community leaders went to great lengths to educate the community and listen to their concerns. The State's decision-making process was benefitted by having this additional feedback from the community, as they expressed their support, as well as concerns, for the remedy that will impact them in their community and homes. The State looks forward to the continued partnership between the State and the Butte Silver Bow Community.

Attachment A: Public Comments

List of Public Comments

No.	Individual/Organization
1	Ian McGruder on behalf of CTEC
2	The Greeley Neighborhood Community Development Corporation Inc., R. Edward Banderob, President
3	Leo Berry on behalf of BNSF Railway Company and Union Pacific Railroad
4	Robert Brock
5	Evan Barrett
6	Richard Tretheway on behalf of Restore Our Creek Coalition
7	Mollie Maffei on behalf of Butte Silver Bow County
8	Barbara Miller on behalf of Habitat for Humanity

CITIZENS TECHNICAL ENVIRONMENTAL COMMITTEE

P.O. Box 593 | 27 West Park Street | Butte, Montana 59703-0593
406-723-6247 | www.buttectec.org | Buttectec@Hotmail.com

June 25, 2020

Assistant Attorney General
US DOJ – ENRD
PO Box 7611
Washington DC 20044-7611

Attn: Federal Superfund Public Comment
MT DEQ/WMRD
P.O. Box 200901
Helena, MT 59620

RE: United States v. Atlantic Richfield Company, et al., Civil Action No. Civil Action No. CV-89-39-BU-SEH

To whom it may concern,

We are writing to express our support for approval of the BPSOU Consent Decree by the U.S. District Court for the District of Montana. We have carefully read this huge document and appendices, looking at the important details, and evaluated it for grave errors. Our opinion is that the Consent Decree will provide Butte the Superfund remedy it deserves, and the cleanup that Butte has been fighting for.

Fourteen years ago when the original 2006 BPSOU ROD was released this wasn't the case. Neither the public nor the State of Montana agreed with EPA that the remedy went far enough to remove mining waste from the city's groundwater and creeks. The 2006 ROD also failed to adequately address the large areas of Butte with unreclaimed/insufficiently reclaimed mining waste and presented a limited scope for the Residential Metal Abatement Program, especially with regards to attic dust. CTEC was very critical of that 2006 remedy and the slow follow-through on the less than adequate cleanup it gave us.

Through fourteen years of hard fought negotiations by Butte Silver Bow and State of Montana as well as many important studies by the scientific community including the Montana Bureau of Mines and Geology, as well as EPA, Natural Resource Damage Program, and ARCO's consultants, we have arrived at a remedy which actually fits the problem in both scale and depth. We are frankly surprised how far things have come.

We are not saying the Consent Decree is perfect. We believe that remedy should have paid for the Parrott Tailings removal, which the State is now funding. We are concerned that the Consent Decree allows for potential "further waivers" of water quality standards down the road, if the

remedy as proposed fails to meet the Federal "replacement standards" which will protect fish and aquatic life. We understand community concern that the Consent Decree should include a requirement and funding for restoration of Upper Silver Bow Creek. We also acknowledge that some community members find that because the Consent Decree was negotiated behind closed doors they have a lack of trust that it was negotiated in the public's favor. We recognize that the Consent Decree is a negotiated compromise and in any compromise you don't get everything you want. However, we do believe the remedy as laid out in the ROD amendment and Consent Decree will protect human health and the environment, which is the ultimate bar by which it should be measured.

We see several risks to not approving the Consent Decree. First, we believe the revised ROD, and the proposed settlement with its end land use provisions will benefit Butte and should not be passed up. Second, we do not believe that Superfund cleanup should wait any longer. Butte citizens have literally been waiting their entire lives to see how the town will bounce back from the environmental destruction caused by a century of unregulated mining. If the Consent Decree is not approved we believe a further protracted battle regarding the scope and extent of the remedy work is likely. Lastly, without the Consent Decree there is little incentive for the remedy to be designed to incorporate the headwaters park which the Butte community laid out in the public visioning meetings.

CTEC intends to continue to work with EPA, ARCO/BP, and Butte Silver Bow as the CD proceeds into design, engineering and construction to make certain that the final designs for the remedy components and land use additions meet the stringent requirements of the Consent Decree and the public's expectations of a clean and healthy environment and attractive restoration of Butte's landscape. The public will also have opportunity to be involved in further decisions on the outcome of the remedy. The Consent Decree specifically requires input from the public in regard to the future land use of proposed park areas and design of stormwater basin areas. The public will also have the opportunity to comment to EPA and DEQ on the official designs and plans produced by the settling defendants and which the agencies will review and approve.

Sincerely,

Dave Williams
President
Citizens Technical Environmental Committee

Cc:
CTEC Board of Directors /Technical Advisors
Nikia Green, EPA
Daryl Reed, DEQ
ARCO/BP, Josh Bryson
MT Standard, David McCumber/Kristine DeLeon

Citizens Technical Environmental Committee (CTEC)
CTEC is a public resource in Butte's Superfund process and is independent of EPA, DEQ, or ARCO/BP. CTEC is funded by the volunteer work of its board members and by an EPA Superfund Technical Assistance Grant.

CTEC's mission is to help people in the Butte area to understand complex Superfund information and develop informed questions and opinion, so that they can become involved in the decision-making process for the ongoing cleanup of mine wastes and related environmental damages in the area.

GN

Tue 7/7/2020 8:33 AM

Greeley Neighborhood <Greeleyneighborhoodbutte@outlook.com>

[EXTERNAL] Public Comment - (relative to the proposed Butte Priority Soils Operable Unite [BPSOU] Consent Decree)

To DEQ FSCB

Cc Ed Banderob; Steven McGrath; Denise Kagie; Betty Banderob; Roberta Dobb; Larry Winstel; Terry Schultz

We removed extra line breaks from this message.

Attn: Federal Superfund Public Comment,
DEQFSCB@mt.gov
MT DEQ/WMRD, P.O. Box 200901, Helena, MT 59620."

Ref: Proposed Butte Priority Soils Operable Unite [BPSOU] Consent Decree)

Sub: Public Comment

In that the remedies and restorations proposed in this Consent Decree do not include on going long term monitoring and control to ensure appropriate minimization of human exposure to hazardous to human health airborne heavy metals contaminants present in the Butte Priority Soils Operable Unite [BPSOU designated area from historic mine waste, we hereby request that the BPSOU Consent Decree be amended to include an Airborne Hazardous to Human Health Heavy Metal Dust Monitoring and Control Program.

Please see attachments:
- 2020-02-28 LT B-SB CEO & CoC - CD BPSOU Dust Monitoring & Control
- 2019-05-00 LT B-SB CEO & CofC - BPSOU Dust Monitoring Control
- (Proposed) Amendment - EPA BPSOU ROD - Metals Monitoring & Control In Dust

Respectfully submitted for your consideration and action, For And On Behalf Of The Greeley Neighborhood Community Development Corporation Inc.
R. Edward Banderob, President

cc: GNCDCInc. Officers & Board

--
"Neighborhood Communities can still be found by those who are willing to seek them!"
https://urldefense.com/v3/__https://greeleyneighborhoodbutte.org/__;!!GaaboA!5mW-Z5UscbS322E1Q_LIHYwHedHFYlfmqxojA6f-WfgIfk2zXmLa3oiMKlztPdI$

Greeley Neighborhood Community Development Corporation Inc.

c/o 2601 Grand Ave., Butte MT. 59701, Phone: 406 723 3736 e-mail greeleyneighborhoodbutte@outlook.com

Seeking common solution to common concerns,
thus making our neighborhood, our community a safer, healthier, happier, harmonious, and a more attractive place in which to live and work, by working with our local government.

February 28, 2020

Attn: Butte-Silver Bow Chief Executive Officer
Butte-Silver Bow Council Of Commissioners, and Members There Of
Butte-Silver Bow Superfund Coordinator and Members B-SB Superfund Division
155 West Granite Street, Butte, Montana 59701

Ref: Proposed Amendment to the Butte Priority Soils Operable Unit (BPSOU) Consent Decree

Sub: Request for this Butte-Silver Bow City-County Government to submit a request that the BPSOU Consent Decree be amended to include an Airborne Hazardous to Human Health Heavy Metal Dust Monitoring and Control Program

In That:
Betsy Smidinger, EPA's Region 8 Superfund chief said; "the decree specifies how all that work will be implemented, monitored and evaluated to make sure the results of the work are protective of human health and the environment."

Hazardous to human health heavy metal contaminants are ingested by humans through the mouth, and inhaled by humans through the nose.

There are about 250 groundwater test wells in the greater area to test for contaminants to protect the fish.

There is only one (1) air monitoring station in the area (that is not even located in the BPSOU area) to test for contaminants to protect the humans.

We question how can the EPA make the statement;
". . . to make sure the results of the work are protective of human health and the environment . . ." when monitoring for hazardous to human health airborne heavy metals is not even a part of the Scope of this Consent Decree?

- Therefore:

- On behalf of the GNCDCInc., I hereby request for this Butte-Silver Bow City-County Government to submit a request that the BPSOU Consent Decree be amended to include an Airborne Hazardous to Human Health Heavy Metal Dust Monitoring and Control Program.

Respectfully submitted for your consideration and action,

For And On Behalf Of The Greeley Neighborhood Community Development Corporation Inc.

R. Edward Banderob, President

Attached:
- GNCDCInc. - LT B-SB CEO & CofC Dust Monitoring Control
- Proposed Amendment to the ROD Document - Monitoring and Control of Airborne Metal Laden Hazardous To Human Health Dust

Greeley Neighborhood Community Development Corporation Inc.

c/o 2601 Grand Ave., Butte MT. 59701, Phone: 406 723 3736 e-mail greeleyneighborhoodbutte@outlook.com

Seeking common solution to common concerns,
thus making our neighborhood, our community a safer, healthier, happier, harmonious, and a more attractive place in which to live and work, by working with our local government.

May 20, 2019

Attn: Butte-Silver Bow Chief Executive Officer
Butte-Silver Bow Council Of Commissioners, and Members There Of
Butte-Silver Bow Superfund Coordinator and Members B-SB Superfund Division
155 West Granite Street, Butte, Montana 59701

Ref: Proposed Amendment to the U.S. Environmental Protection Agency's (EPA) Butte Priority Soils Operable Unit (BPSOU) 2006/2011 Record of Decision

Sub: Request for this Butte-Silver Bow City-County Government to submit a letter requesting an Airborne Dust Monitoring and Control Program Amendment be added to the EPA's Proposed Plan to Amend the 2006/2011 Record of Decision

In That:

Neither the current EPA Butte Priority Soils Operable Unit 2006/2011 Record of Decision nor the EPA's Proposed Plan to Amend the BPSOU 2006/2011 Record of Decision contain a provision for an ongoing Airborne Dust Monitoring and Control Program that would ensure that the proper clean up of the BPSOU site has been completed to protect human health, and to ensure that proper monitoring and control of airborne dust is carried out so that the citizens of Butte and the outside world will be assured, beyond a reasonable doubt, that the BPSOU Superfund site has been properly remediated and restored and not re-contaminated, and that Butte is a healthy place in which to live and work.

Therefore:

On behalf of the GNCDCInc., I hereby request that this Butte-Silver Bow City-County Government draft a letter and submit it to the EPA, before the June 11, 2019 Comment deadline, requesting that an Airborne Dust Monitoring and Control Program Amendment be added to the EPA's Proposed Plan to Amend the 2006/2011 Record of Decision, and authorize the B-SB Chief Executive and B-SB Council Chairman to sign said letter for and on behalf of the Butte-Silver Bow City-County Government.

Respectfully submitted for your consideration and action,

For And On Behalf Of The Greeley Neighborhood Community Development Corporation Inc.

R. Edward Banderob, President

Attached:

- GNCDCInc. - Comment - Proposed Plan to Amend the 2006/2011 Record of Decision - Proposed Amendment to the Document - Monitoring and Control of Airborne Metal Laden Hazardous To Human Health Dust

Ref: Proposed Plan to Amend the 2006/2011 Record of Decision
U.S. Environmental Protection Agency's (EPA)
Butte Priority Soils Operable Unit

Sub: Proposed Amendment to the Document

Monitoring and Control of Airborne Metal Laden, Hazardous To Human Health, Dust

##.1 Monitoring

To prevent the exposure to airborne metals, determined to be hazardous to human health by the American Medical Association from impacting human health in the Butte Silver Bow City-County area, with funds provided by the Responsible Parties, (Portion of funding to be as determined by agreement to degree of contaminant contribution from historic mining, active mining and natural surface geology.), Butte-Silver Bow (B-SB), with guidance from EPA and Montana Department of Environmental Quality (DEQ) will perform the following ongoing monitoring of Airborne Metal Laden Dust every year during the months of; April, May, June, July, August, September with monitoring equipment located at the Greeley Monitoring Station and at least one location in each of the B-SB Council of Commissioner Districts within and outside the EPA's BPSOU.

Air quality monitoring to be as follows;
- PM2.5 for particulate
- PM10 for particulate
- TSP for particulate
- TSP and PM10 speciation
- Speciation study of TSP and PM10 for heavy metals

##.2 Control

Appropriate obtainable Local PM10 and TSP Airborne Metals Standard will be established.

When monitoring detects excessive airborne contamination in any area appropriate mitigation and/or remediation actions will be taken to prevent further human health risks and/or contamination of previously remediated and/or restored sites in the BPSOU area.

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July 9, 2020

Via Priority Mail Express

Assistant Attorney General
US DOJ – ENRD
PO Box 7611
Washington DC 20044-7611

Via Priority Mail Express

Attn: Federal Superfund Public Comment
MT DEQ/WMRD
P.O. Box 200901
Helena, MT 59620

Re: Formal Comments by BNSF Railway Company and Union Pacific Railroad

Proposed *Consent Decree for the Butte Priority Soils Operable Unit Partial Remedial Design/Remedial Action and Operation and Maintenance*, lodged June 8, 2020:

United States and State of Montana v. Atlantic Richfield Company, et al., Civil Action No. CV-89-39-BU-SHE, D.J. Ref. No. 90-11-2-430

Published June 15, 2020, 85 FR 36237, and http://deq.mt.gov/Public/publiccomment

Dear Assistant Attorney General and Montana DEQ:

BNSF Railway Company (BNSF) and Union Pacific Railroad (UP) hereby jointly submit comments on the Proposed *Consent Decree for the Butte Priority Soils Operable Unit Partial Remedial Design/Remedial Action and Operation and Maintenance*, lodged June 8, 2020 and published for public comment on June 15, 2020. BNSF and UP in part rely on and incorporate by reference their enclosed prior correspondence to EPA and DOJ as follows:

- BNSF's September 16, 2011 UAO letter of intent with attachments and exhibits (Exhibit A, 2011 BNSF Letter),

- UP's September 15, 2011 UAO letter of intent (Exhibit B, 2011 UP Letter), which likewise included a subset of the attachments to the 2011 BNSF Letter (not duplicated here for purposes of the present letter),

- BNSF's and UP's joint August 20, 2009 letter to EPA/DOJ with redactions to comply with a protective order and with Exhibits and Attachments specified therein (Exhibit C, 2009 Joint Letter), and

- BNSF's and UP's joint November 21, 2008 letter to EPA/DOJ with redactions to comply with a protective order and with enclosures specified therein (Exhibit D, 2008 Joint Letter).

This letter and the above enclosures are provided in hard copy and enclosed digital CD. We appreciate the opportunity to provide comment, respectfully made as follows.

1. **The Consent Decree textual definition of "Railroad Properties" at pages 27-28 should include qualifications that BNSF and UP dispute the accuracy of the purported map of their combined property interests as contained in Appendix F.**

As EPA knows, BNSF and UP have vigorously disputed the accuracy of many aspects of the property depictions in the purported map of combined BNSF and UP property interests contained in Appendix F. BNSF and UP included a map of their combined property interests in BPSOU with their 2009 Joint Letter (Exhibit C) and as exhibit 1 to the 2011 BNSF Letter (Exhibit A). That map differs in many property boundary details from the map in Appendix F. We appreciate that "Notes" were added to Appendix F stating:

> 2. The Railroad Properties depicted here may not indicate the exact property boundary of any given property. If disputes arise concerning the exact boundary of the Railroad Properties, recorded land records will be consulted to determine the exact boundary.
> 3. The precise boundaries of the Railroad Properties are in some cases disputed by the Railroads. The boundaries set forth in this Appendix F are for illustrative purposes only and are not intended to precisely define the boundaries of the Railroad Properties.

BNSF and UP request that those Notes, or the import of them, also be added to the Consent Decree textual definition of Railroad Properties to properly reflect these important qualifications.

2. **The Consent Decree's very brief summary in Section L of the industrial history which resulted in the pertinent contamination of BPSOU implies several misimpressions about BNSF's and UP's combined property interests and contribution to BPSOU contamination.**

The Consent Decree in Section L at page 7 recites an extremely brief summary of contamination associated with the industrial history in BPSOU:

> The extensive mining, milling, and smelting activities that occurred within the BPSOU included over 300 mines (which produced contaminated overburden and other wastes), over 19 mills and smelters (which produced tailings, fines, and other contaminated wastes), and an extensive network of railroad beds and lines (some of which were created with contaminated materials in some areas and which received spills of contaminated concentrate and waste in some areas). At least 197 contaminated source areas, or facilities, were created from these operations within the BPSOU. Aerial emissions from the mills and smelters contributed to the spread of contamination throughout the BPSOU, including residences, yards, and business locations within and adjacent to the BPSOU. Stormwater is impacted by run-off from the source areas and Railroad Properties, which contributes to the spread of Hazardous Substances throughout the BPSOU, including the alluvial groundwater aquifer, Blacktail Creek and Silver Bow Creek. The stormwater conveyance system within the BPSOU is a source of continuing contaminated storm water discharges to lower Silver Bow Creek. All of these mechanisms contributed to the release or substantial threat of release of Hazardous Substances in and from the BPSOU. Naturally occurring metals and arsenic are also present within the BPSOU, which has resulted in contributions of metals and arsenic to stormwater, surface water, soils, and groundwater in BPSOU, although the Parties disagree as to the extent of such contributions.

(Emphasis added).

The underlined portions of the above summary convey misimpressions as to BNSF and UP, primarily as set forth below.

a. The above summary combined with use of the generalized term "Railroad Properties," limited to the property interests of BNSF and UP, conveys a misimpression that the BNSF and UP properties and related operations mostly comprise the referenced "extensive network of railroad beds and lines."

A misimpression is created by generally referring to BNSF and UP property interests as "Railroad Properties" without describing the scope of other entities' historical and current railroads and rail spurs. Most notably, the Butte, Anaconda & Pacific (BAP) railroad facilities and historical operations for which Atlantic Richfield Company (ARCO) bears successorship responsibility are not in any way described. [1]

[1] Other railroads also operated historically in Butte, particularly the Chicago, Milwaukee, St. Paul and Pacific Railroad. Rarus Railway, LLC, "d/b/a Butte, Anaconda & Pacific Railway Company," a subsidiary of Patriot Rail Company, LLC, is mentioned as a defined term and as a potentially responsible party who participated in negotiations but is not a party to the Consent Decree, and whose facilities owned and operated by Rarus are not "Railroad Properties" for purposes of that defined term in the Consent Decree. CD pp. 5, 28. However, no

In 1883, ARCO predecessor the Anaconda Copper Mining Company (ACMC) built its own smelting facility in Anaconda, 25 miles away. Shortly thereafter, in the early1890s, ACMC built its own railroad between Butte and Anaconda, the Butte, Anaconda & Pacific ("BAP"), thus monopolizing the mining, transportation, and smelting of copper ore and related materials. In 1977, ACMC merged with ARCO. ARCO succeeded to the environmental liabilities of the ACMC associated with the Butte Site, including the more than 90 years of rail operations conducted by ACMC's electrified railroad, the BAP, which hauled ore and concentrate from the Butte Site in BPSOU to Anaconda. The BAP's historical rail traffic associated with ACMC's extensive mining activities far and away exceeds the approximate ten years of ore-hauling-related rail traffic conducted by BNSF's and UP's predecessors, in some instances by a time period of more than 80 years, not to mention the incredibly vast quantities of ore and concentrate hauled by the BAP.[2] According to some accounts, the BAP operated 24-hours a day, seven-days per week, including trains over 100 cars long. By 1912, the BAP was hauling up to 600 carloads (approximately 30,000 tons) of ore per day from Butte to Anaconda, earning it the nickname "the biggest little railroad in the world."[3]

The following photograph and caption, published in the Montana Standard,[4] provides an exemplary snippet of ACMC's massive mining, processing, smelting and BAP rail transport operations and associated contamination in BPSOU:

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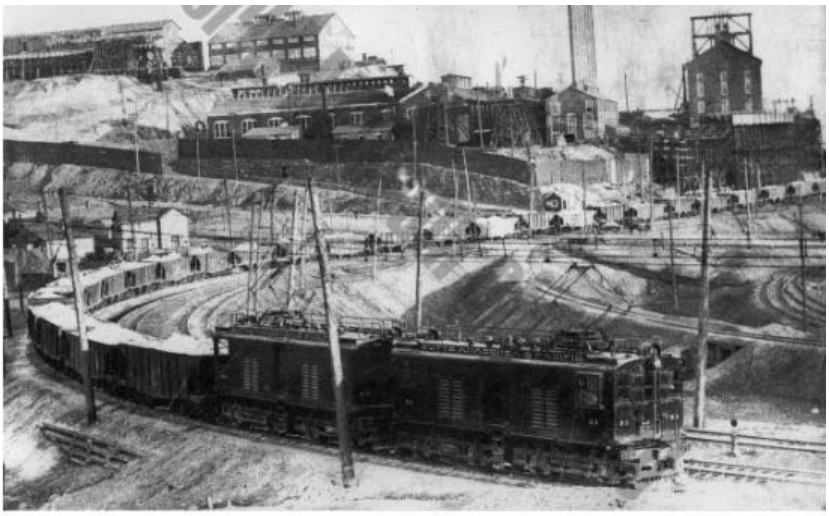
description is given as to the scope of those facilities, much less the BAP railroad lines and operations which resulted in massive contamination for which ARCO is responsible as ACMC's successor.

[2] See 2006 Butte Priority Soils Operable Unit Record of Decision, Section 2.

[3] See https://missoulian.com/unwind/riding-the-rails-of-time-copper-king-express-offers-history-rich-excursion-through-durant-canyon/article_93d09587-d49e-55e9-bb61-ba5539d4ade5 html; https://www.spokesman.com/stories/2006/jun/11/copper-king-express-travels-back-in-time/; and https://mtstandard.com/butte-anaconda-pacific-railway/image_ef2d636f-ca51-5981-9fe9-0caf2a93c606.html. That information had previously been published at http://www.copperkingexpress.com/aboutus html, a link that is no longer functional.

[4] See https://mtstandard.com/butte-anaconda-pacific-railway/image_ef2d636f-ca51-5981-9fe9-0caf2a93c606 html.



A Butte, Anaconda & Pacific Railway ore train is pictured on the Butte Hill, circa 1915. Some of the trains included more than 100 cars carrying ore.

Some description of the other railroads which have historically operated and had facilities in BPSOU, particularly the BAP for which ARCO is responsible, should be added to Section L to avoid the misimpression as to use of the term "Railroad Properties" within Section L, defined elsewhere to mean only BNSF and UP properties, together with the undefined general reference to extensive railroad beds and lines in BPSOU.

b. The summary conveys a misimpression that BNSF and UP properties and related operations are causing stormwater impacts by run-off which contributes to the spread of Hazardous Substances throughout the BPSOU, including Blacktail Creek and Silver Bow Creek.

Section L creates an impression that stormwater run-off from the BNSF and UP properties is impacting BPSOU groundwater throughout the BPSOU, including Blacktail and Silver Bow creeks:

> Stormwater is impacted by run-off from the source areas and Railroad Properties, which contributes to the spread of Hazardous Substances throughout the BPSOU, including the alluvial groundwater aquifer, Blacktail Creek and Silver Bow Creek.

(Emphasis added).

That implication is wrong and should be corrected for the following reasons.

BNSF and UP concur that there has been and remains widespread stormwater hazardous substances impacts throughout the five-square mile/4,000 acre BPSOU Site from the massive contamination which resulted from the extensive mining, smelting, roasting, concentrating and milling operations and facilities of others (primarily ACMC/now ARCO) throughout BPSOU.

However, as thoroughly detailed throughout the lengthy enclosed 2008, 2009 and 2011 letters (Exhibits A-D) listed above, widespread impact cannot be attributed to BNSF and UP properties and facilities which are comprised of a few slivers of surficial property interests occupying an identifiably tiny and readily divisible area within BPSOU. Those property slivers are depicted in a BNSF and UP properties map which is Exhibit 1 to the enclosed 2011 BNSF Letter (Exhibit A). They include a narrow east-west (mostly joint) Main Line, the joint Lower Yard, and three BNSF only facilities comprised of the Middle Yard (with Wye) and Upper Yard near the bottom of Butte Hill, and a one mile segment of the five-mile Newcome Branch in the southwest area of BPSOU.

Parts of the BNSF and UP properties contaminated with mining-related materials (generated by ACMC) have been remediated. A 2000 Time Critical Removal Action for railbeds (Railbeds TCRA) pertained to portions of BNSF and UP properties within BPSOU. BNSF and UP completed performance under the Railbeds TCRA for their combined properties by 2004.

As described and referenced in detail in the 2009 Joint Letter (pages 4, 21-24, Exhibit C), the 2011 BNSF Letter (pages 5-8, Exhibit A) and 2011 UP Letter (pages 6-7, Exhibit B), the estimated volume of contamination on the combined BNSF and UP property interests has been from .79% up to a maximum of 1.29% (or 144,950 cubic yards – essentially all generated by ACMC) of the total volume of about 12 million cubic yards estimated contaminant waste in BPSOU.

As described in substantial detail in the 2009 Joint Letter (pages 4-16, Exhibit C) and 2011 BNSF Letter (pages 15-17, Exhibit A), the BNSF and UP properties are outside or downgradient of all of the Butte Hill stormwater run-off gulches and other areas requiring remediation. Only a small portion of one run-off gulch, Buffalo Gulch, is downgradient of part of Lower Yard. BNSF and UP have completed capping and installed two stormwater retention basins there. In addition, in 2001 BNSF and UP removed 3,500 cubic yards of soil from their property near the bottom of one other gulch, Grove Gulch, where millions of cubic yards of Clark tailings exist at the uphill end away from BNSF and UP properties.

EPA's current 2011-issued UAO at least partially acknowledged the divisible BNSF and UP properties area in designating BNSF and UP as "Group 2" respondents (subject to work pertaining their own properties). As with the completed Railbeds TCRA, BNSF and UP have been maintaining their properties in compliance with their UAO Group 2 requirements for BNSF and UP properties without involvement elsewhere in BPSOU since the 2011 UAO was issued.

Far from association with stormwater run-off problems throughout BPSOU, the combined BNSF and UP properties have, therefore, only been associated with identifiably small and *de minimis*[5] soil and limited stormwater run-off issues, all of which are essentially remediated and controlled by capping and BMPs that include multiple conservatively structured

[5] BNSF and UP have repeatedly sought a deserved *de minimis* determination in the enclosed correspondence, beginning with their 2008 Joint Letter (Exhibit D) (without any response).

retention basins (subject to BRES inspections and O&M). The Section L summary reference to Railroad Properties should be corrected to except BNSF and UP properties from the summary statement about stormwater impacts.

c. The summary conveys a misimpression that BNSF and UP properties are causing alluvial groundwater aquifer hazardous substances impacts in BPSOU.

Section L creates an impression that the BNSF and UP properties are impacting BPSOU groundwater:

> Stormwater is impacted by run-off from the source areas and Railroad Properties, which contributes to the spread of Hazardous Substances throughout the BPSOU, including the alluvial groundwater aquifer, Blacktail Creek and Silver Bow Creek.

(Emphasis added).

That impression is wrong and should be corrected for the following reasons.

A substantial portion of the alluvial groundwater aquifer in BPSOU is subject to a technical impracticability waiver (TI waiver) because it is so contaminated from tailings and other mine waste from the nearly 150 years of mining operations at the Butte Site. These vast amounts of mining wastes were disposed of in and adjacent to upper Silver Bow Creek (the area previously referred to as the Metro Storm Drain) and Lower Area One (LAO) (which together comprise what have been portions of Silver Bow Creek) and remain there, continuing to impact groundwater throughout the area. The 2009 Joint Letter at pages 5-7 (Exhibit C) with reference to exhibits provides extensive information regarding those tailings and their impact on alluvial groundwater. The groundwater remedy required by the ROD has been and remains complex. ARCO and Butte Silver Bow have performed and are performing the groundwater investigations and remedial actions.

Conversely, BNSF and UP have never had any involvement in any EPA-required groundwater investigation or remediation. EPA has not required groundwater sampling at BNSF and UP properties in either the current UAO or any prior EPA orders. Although BNSF and UP have previously asked EPA for evidence that contamination from their properties have contributed to the BPSOU groundwater contamination, no information beyond general speculation has been provided.

The BNSF and UP properties have no connection to the BPSOU alluvial groundwater contamination for the reasons detailed in the 2008 Joint Letter (page 7, Exhibit D), the 2009 Joint Letter (page 6, Exhibit C), and the 2011 BNSF letter (pages 12-15, Exhibit A) with reference therein to enclosures or attachments to those letters. While the BNSF and UP Lower Yard area is within the TI waiver zone and surrounded by highly contaminated groundwater, as documented in a letter to EPA in 2004, all sampling results from alluvial groundwater beneath

Lower Yard meet the MCLs and Montana DEQ-7 standards for groundwater[6], thereby confirming that the relevant BNSF and UP property is not a source of groundwater contamination in BPSOU. That letter and the sampling results and related documentation are included with and discussed at pages 13-14 of the 2011 BNSF Letter (Exhibit A). BNSF and UP voluntarily sampled Lower Yard groundwater prior to performing the Railbeds TCRA work. Further confirmation that the BNSF and UP property is not a source of groundwater contamination in BPSOU are groundwater loading calculations discussed at length at pages 13-15 of the 2011 BNSF Letter (Exhibit A) with reference to exhibits.

d. Because the scope and relative contribution of the BNSF and UP properties is identifiably tiny, *de minimis* and readily divisible, the summary creates a misimpression that their railroad properties and facilities have caused widespread BPSOU contamination by lumping them with the extensive mining, milling, smelting and related source activities which have caused massive contamination throughout BPSOU.

Section L creates a misimpression that the BNSF and UP properties are associated with the massive contamination throughout BPSOU:

> The extensive mining, milling, and smelting activities that occurred within the BPSOU included over 300 mines (which produced contaminated overburden and other wastes), over 19 mills and smelters (which produced tailings, fines, and other contaminated wastes), and an extensive network of railroad beds and lines (some of which were created with contaminated materials in some areas and which received spills of contaminated concentrate and waste in some areas). At least 197 contaminated source areas, or facilities, were created from these operations within the BPSOU.…All of these mechanisms contributed to the release or substantial threat of release of Hazardous Substances in and from the BPSOU.

(Emphasis added).

That impression is wrong and should be corrected for the following reasons.

The approximate 4000-acre/five square mile BPSOU is centered on the historic mining area of Butte Hill, "the richest hill on earth." As EPA is well aware, the vast majority of contamination within and from the BPSOU is a result of mining, milling and smelting activities over about 120 years, conducted by companies other than BNSF and UP, particularly ACMC (to which ARCO is the legal successor).

[6] The Kennedy/Jenks June 15, 2004 letter to EPA's Ron Bertram is, together with related documents, an attachment/enclosure to the 2008 Joint Letter (Exhibit D) and the 2011 BNSF Letter (Exhibit A).

Since 1864, the Butte area has been mined for precious metals, most notably copper. By the 1880s, there were over 300 operating copper mines, at least 10 silver mines, five smelters, and over 4,000 posted claims in Butte. For many years, ore processed in and around Butte was mined from approximately 10,000 miles of underground workings and several gaping open pit mines. Open pile roasting, milling, and concentrator ore processing operations were historically located in the BPSOU. In addition to other types of mine waste generated by these activities, smelting and ore roasting historically created severe air quality problems in Butte with toxic fallout that inhibited growth of vegetation. As mentioned above, in 1883 ACMC built its own smelting facility in Anaconda, 25 miles away and built the BAP railroad, thus monopolizing the mining, transportation, and smelting of copper ore.

Between 1910 and 1927, ACMC consolidated, with few exceptions, all of the major mines, smelters, and mills in Butte. Mining in Butte was entirely underground until 1955, when ACMC began surface mining in the Berkeley Pit. It was these mines, smelters, processes and mills that produced air emissions that contaminated residential yards and attics throughout the BPSOU, and produced large quantities of waste, such as tailings and slag. These mines also produced massive waste rock dumps and overburden piles throughout Walkerville and Butte. Moreover, since 1964, the Weed Concentrator produced large quantities of waste in the active mine area and discharged large volumes of contaminated water to upper Silver Bow Creek (the area previously referred to as Metro Storm Drain).

Those operations mined and processed hundreds of millions of tons of rock. As mentioned above EPA's estimate of known mine waste in the BPSOU is about 12 million cubic yards of mining waste contamination, particularly heavy metals and arsenic, that were dumped extensively throughout the BPSOU, including Silver Bow Creek and impacting Blacktail Creek and related flood plains. The BPSOU is bordered on the east by the enormous and severely contaminated Berkeley Pit. Among other historical and enduring contaminated mine-waste features within the BPSOU are the Alice Dump and Pit, the Granite Mountain Memorial Interpretive Area (GMMIA) (including former Speculator, Granite Mountain, Badger State, Bell Diamond, and other mines), Syndicate Pit, Parrott Tailings, Colorado tailings, North Side Tailings, Diggings East and Clark Tailings.

In short, and as detailed in much greater detail in the four prior BNSF and UP letters listed above (Exhibits A-D), the foregoing ACMC activities account for the overwhelming geographical area impacted by, and massive volume of the contamination in BPSOU. Much of that waste remains in place even after numerous response and removal actions taken primarily by ARCO under numerous EPA orders since the late 1980s prior to the current UAO, none of which involved BNSF and UP except part of the limited railroad beds TCRA which BNSF and UP completed comparatively rapidly many years ago.

In stark contrast, as recounted above, BNSF and UP properties and facilities have occupied and had impact on relatively tiny identifiably divisible and *de minimis* slices of BPSOU, accounting for only .79% to 1.29% of the historical volume of contamination in BPSOU. Moreover, as discussed above, BNSF and UP have already taken actions to remediate

most of the issues concerning their properties subject to required operation and maintenance. Consent Decree Section L, then, creates a gross misimpression by lumping the BNSF and UP railroad properties with the mining, milling and smelting activities and related sources in the summary of the history and scope of extensive contamination in BPSOU. Either more detailed descriptions of the various "sources," parties and scopes of contamination should be provided for a fair and accurate perspective, or distinguishing reference should be made to the BNSF and UP Railroad Properties as minor divisible sources where cleanup actions have for the most part already been taken.

In conclusion, BNSF and UP respectfully request modifications to the proposed Consent Decree in accordance with each of the above comments.

Thank you.

Sincerely,

BROWNING, KALECZYC, BERRY & HOVEN, P.C.

By _____
Leo Berry

cc: Henry Elsen (via email w/encls on CD by regular mail)
James Freeman (via email w/encls on CD by regular mail)
Jon Morgan (via email w/encls on CD by regular mail)
Eileen Joyce (via email w/encls on CD by regular mail)
Jean Martin (via email w/encls via ShareFile)
Brooke Kuhl (via email)
Robert Bylsma (via email)
Robert Lowry (via email)

July 13, 2020

To whom it may concern,

The following are modified comments that were submitted to EPA and DOJ in response to the proposed Superfund consent decree in Butte. I have modified these comments to specifically highlight the concerns I have for the State of Montana should the CD be accepted as written. Simply put, the State of Montana should not be party to this consent decree as written as it potentially creates a flawed precedent that will be utilized over and again by those looking to lower water quality standards in Montana. Water quality in this state is more important than just about anywhere else due to the economic impact clean water has on our two largest industries: tourism and agriculture. As such, the standard used in Montana must be protected at all costs. This consent decree does the exact opposite.

As citizen of Butte of Butte-Silver Bow, I have had an inherent interest in the fate of Silver Bow Creek since I was in grade school. Now as a father, I have an inherent interest in this consent decree as it will determine the quality of life in this community for my children. Simply put, this consent decree fails to deliver on the intent of Superfund in the following two ways.

First, atypical of CERCLA settlements from anywhere else in the United States, this consent decree makes a fundamental change to the Record of Decision by waiving water quality standards not once but twice. In their response to public comment from the release of the draft, EPA makes no secret that it does not waive standards in CERCLA cases lightly. Their reluctance to do so is based on the fact that the two overarching principals of a Superfund remedy are to clean an area up to the point that it is 1: protective of human health and the environment and 2: able to meet "applicable and relevant and appropriate requirements" (ARARs.) These ARARs, being objective scientific standards, are the only way to guarantee a remedy is protective of human health and the environment.

So important are these ARARs to the efficacy of a Superfund remedy that CERCLA demands that between federal and state water quality standards, the more protective standard is to be used in a remedy. As such, the Record of Decision for Silver Bow Creek has contained the more protective State of Montana standard. This consent decree immediately waives that standard to the lesser, but still measurable and protective federal standard. Recognizing the challenges of Upper-Silver Bow Creek, I am supportive of this waiver as it consistent with waivers downstream and it is consistent with Superfund settlements across the United States. If the consent decree stopped there, like every other consent decree I can find does, these comments would be whole-heartedly supportive.

Unfortunately, uniquely, and inexplicably, however, this consent decree contains a second waiver of water quality standards in the event the remedy fails to meet the waived-to federal water quality standards. In other words, despite getting an immediate waiver to a lesser standard for copper and zinc, this consent decree does not compel the parties to meet that standard. The threshold for triggering this contingent waiver is remarkably low: more than 1 exceedance of the water quality standard in a 3-year period. This concept of contingency waivers is unorthodox at best and reckless at worst, which is why it is not used anywhere else. The State of Montana should not be party to any agreement than in effect says, "pollute then try to clean it up, if you can't get it clean the first time, then we will just change how we define clean."

Even more inexplicable than the secondary waiver for copper and zinc is the fact that if the contingency standard is utilized it also waives standards for every other contaminant in the water. In other words, even though there is no reason to waive the standard immediately for things like lead or cadmium, this consent decree waives them permanently down the road just for good measure. Again, the threshold that triggers this permanent reduction is exceedingly low and based on the track record of exceedances in Butte, should be considered a given. The State of Montana should not be party to an agreement that lowers any water quality standard automatically without any explanation as to why. If these contaminants needed a waiver, why are they not addressed immediately?

In response to these comments, I asked EPA and DOJ to specifically provide by name any examples of other consent decrees from outside Southwest Montana that contain both immediate and fallback waivers such as this. I also asked the EPA to provide a single example of a situation where a contaminant standard is not waived during the first waiver, but contains a waiver with the second contingency as is the case here for lead, cadmium, etc. I have been informed publicly by EPA staff in the area that such examples do not exist and in my research, I too have been unable to find them. If that is in fact the case, the secondary waiver on its face should be removed from this consent decree before it accepted by the Court and the State of Montana should not be a party to the agreement until this contingency waiver is removed.

If the secondary waiver were not bad enough for the assurance this remedy is protective of human health and the environment, the second and even more egregious flaw of the consent decree is the fact that the secondary waiver is to a scientifically inappropriate standard. When the secondary waiver is triggered, it will permanently leave the parties and more importantly the residents of Southwest Montana unable to measure the toxicity of copper and zinc in Silver Bow Creek and ultimately on the Upper Columbia watershed. It will also expose the water quality standards for aquatic life in Montana to legitimate challenges from those who seek to lower them.

In order to understand why the second water quality waiver is so inappropriate these comments are going to deviate now into a bit of lesson in basic science. This consent decree basically contains three different water quality standards that are used to measure contaminants that make their way into Silver Bow Creek during “wet-weather events” like storms. The first standard is the one that has been in place to date for metals like copper and zinc. That is the “Total Recoverable” standard used by the State of Montana and it measures the total recoverable concentration of a given contaminant. In other words, in a liter of water, how much total contaminant is in there. The second is the “Dissolved” standard and this is the immediate, upfront waiver, which is the federal standard. In other words, in a liter, how much copper is dissolved in the water. The dissolved standard is useful because it is well established that dissolved contaminants are much more lethal to life in water. Both the total and dissolved standards are time-tested and objectively straightforward, i.e. there is X amount of copper in Y amount of water and Z is the threshold for toxicity to life.

The final standard is the fallback waiver standard for copper and ultimately zinc and it is called the “Biotic Ligand Model.” This relatively new standard is based on the understanding of how contaminants actually impact life in relation to everything else in the water. It is a computer model that accounts for how around a dozen different parameters affect the deadliness of a contaminant. Aquatic science has established that things like the amount of organic matter in the water, the pH, or even the temperature of the water can determine how lethal say 100 parts per million copper is to a fish. In distilled water, 100

ppm copper might kill a fish, but mix in all the different dynamics of wild water, and only 10 ppm might actually land on the gills. In a crude analogy, it's the same scientific principle as to why COVID is more deadly in folks that have other things going on in their bodies. Of these three standards, only the Biotic Ligand Model has never been used for regulatory purposes inside of Montana.

The basic logic of the Biotic Ligand Model is scientifically sound and for that reason the EPA has adopted it as its aquatic life standard for *copper in certain conditions.* This consent decree however, uses the biotic ligand model as a fallback waiver not only for copper, but for zinc (even though the Biotic Ligand Model is not approved by EPA for zinc), and crucially it uses it for both metals in conditions for which it was not designed and cannot be accurately used.

If you are going to measure how lethal 100 ppm copper is to a fish in a certain environment, then elementary science dictates that you have to know precisely what that environment contains. If the environment is constantly changing, also known as a nonequilibrium condition, the Biotic Ligand Model cannot be used.

This reliance on equilibrium conditions was understood by the EPA when the Biotic Ligand Model was first discussed by the EPA scientific advisory board back in 2000. Quoting from EPA Publication EPA-SAB-EPEC-00-006, *AN SAB REPORT: REVIEW OF THE BIOTIC LIGAND MODEL OF THE ACUTE TOXICITY OF METALS,* February 2000, Page 9 "The biotic ligand model relies upon equilibrium assumptions, yet the importance of kinetic exchanges of metal between ligands in the micro-environment near the gill membrane is unknown… and raise questions of the predictability of the model under non-equilibrium water quality conditions, such as would be expected under dynamic field conditions (e.g., mixing zones, stream confluences)."

Even in its infancy, the shortcomings of the model for non-equilibrium conditions were recognized by the EPA. As the model continued to be evaluated, these same shortcomings were expanded upon by the EPA. In 2006 EPA's Science Advisory Board continued to raise concerns about non-equilibrium use of the BLM, specifically stating in publication EPA-SAB-CON-06-004, March 8, 2006, that "EPA should consider the real problems and major uncertainties to be addressed. She mentioned the following uncertainties and issues that should be considered…Water quality criteria uncertainty associated with nonequilibrium conditions. There is at least a factor of 10 difference in water quality criteria uncertainty due to nonequilibrium conditions." (Page 11)

A panelist of the EPA's science advisory board went onto explain in that same publication from March 8, 2006 the specific problems that arise in a regulatory framework when trying to utilize the Biotic Ligand Model in non-equilibrium conditions:

"A major drawback of the proposed approach is the omission of consideration of non-equilibrium partitioning of contaminants in the water column (and perhaps in sediment and food). Non-equilibrium partitioning can be especially important for metals, because contact times greater than or equal to 24 hours are necessary to equilibrate free metal ions (e.g., Cu2+) with dissolved organic matter (DOM) under realistic conditions in some natural waters (Ma et al. 1999). Therefore, concentrations of free metal ion in the water column after only a few hours of contact time with DOM can be at least an order of magnitude higher than the concentrations of the same free metal ion after 24 hours of contact time. I suspect a wide spectrum of metal-DOM contact times can be found in the real world. Therefore, before most of the knotty subtleties of time-varying exposures to contaminants and density-dependent

population growth are addressed, I believe the very important reality of non-equilibrium partitioning of metals (and perhaps some organic compounds) should be addressed and incorporated into aquatic life criteria. If we can't get the geochemistry approximately right, we most assuredly run the risk of having greatly under-protective and/or greatly over-protective criteria." (Page C-22)

Ultimately, the EPA recognized these legitimate shortcomings raised by the Board for non-equilibrium conditions and that when inappropriately used it can be wildly under-protective of human health and the environment. Therefore when EPA adopted the Biotic Ligand Model formally in February 2007 it specifically stated under "BLM Uncertainties and Performance" "The BLM employed here uses equilibrium reactions of copper…Nonequilibrium processes might be important, especially regarding the relationship of copper-binding on a surface ligand to toxic action." (Pages 7-8)

It should be clear that starting with the original discussion in 2000, continuing with the more rigorous examination prior to its adoption, and even upon its final adoption as a water quality tool by the EPA in 2007, the Biotic Ligand Model has never been intended for use in non-equilibrium conditions. This isn't just a minor detail, it's the difference between accurately measuring your body temperature with a thermometer in your mouth, and trying to figure out if you have a fever by sticking a thermometer in your mouth while you drink cold beers and eat hot soup. In the latter case, you'll get a lot of readings, but none will be your actual body temperature.

The same holds true for future contaminants in Silver Bow Creek. Throughout the consent decree but for the sake of specific citation on Page 19 of 41 of the Record of Decision Amendment, stormwater is specifically defined as a non-equilibrium condition. Not only is it defined as a non-equilibrium condition, but this very fact was the entire basis for the technical impracticability model for which the parties rely on to form the waivers in the first place.

Over and over again the parties have made the case that stormwater in Butte is too unpredictable and too dynamic, to clean up the creek up to the current State of Montana standards. If that is the case, by definition it is also too dynamic to use the Biotic Ligand Model. Trying to use the Biotic Ligand Model, as it is used in this consent decree, will result in a whole lot of readings in the future, none of which will actually be the lethality of metals in Silver Bow Creek.

In conclusion, I feel these comments are "significant public comment" by the definition used in the guidance of the EPA and DOJ to warrant material changes to the proposed consent decree. I also feel this is the last stop for the State of Montana to jump off this train before you permanently damage water quality standards in this state. This document waives standards in a manner that is inconsistent with anywhere else and leaves the uppermost reaches of this strategically important watershed unable to test contaminants. If you can't test, you can never know if the remedy is protective of human health or the environment. The next time water quality standards are reviewed in Montana as they are a minimum of every three years, or the next time a permit on a watershed like the Smith River is examined, how will the State refute the use of the Biotic Ligand Model for those situations? Once it is utilized in Butte, it will be precedent, and given the materials flaws it contains, it will be precedent that exposes all water in this state to the whims of future administrations looking for any excuse to lower the highly protective standards we have in Montana today.

I know full well everyone is ready "to get beyond Superfund" in Butte and you'll probably receive plenty of comments to that regard. However, if our current state of affairs has taught us anything, it's that you

can’t just decide you’re ready to get beyond scientific law. Like it or not, scientific fact that is ignored, whether it be the infectiousness of a virus, or the difference between equilibrium vs. non-equilibrium conditions, will come back to bite not just those who ignored it, but everyone in the community. More than losing the Superfund moniker, Butte is ready to see Superfund finally fulfill its promise after decades of disappointment. However, by waving the standards twice and by utilizing a scientifically inappropriate tool to measure water quality for perpetuity, we end up with a settlement that fulfills neither of the two legal mandates of Superfund. By making this settlement conform to every other consent decree and just doing away with the second waiver (thereby eliminating the Biotic Ligand Model’s inappropriate use) you have a document that everyone who worked the mines of Butte and everyone who worked the negotiations can be proud of. Approve it as is, however, and you are washing your hands of the Richest Hill on Earth, with water whose quality can never be measured, and exposing the rest of the Treasure State to the same fate.

Sincerely,

Bob Brock
2912 State St.
Butte, MT 59701
(406) 490-8809

From: Evan Barrett <evanbutte@bresnan.net>
Sent: Wednesday, July 15, 2020 2:44 PM
To: DEQ FSCB
Subject: [EXTERNAL] Comment of Evan Barrett to MDEQ in support of the BPSOU Consent Decree (CD)

Comment of Evan Barrett, 807 W. Silver Street, Butte, MT 59701, to MDEQ in support of the BPSOU Consent Decree (CD):

I am a member of the Restore Our Creek Coalition (ROCC). My comments on the CD are as a member of the coalition but also as an individual citizen. I WRITE IN SUPPORT OF THE CD AS SUBMITTED. Yet I think it is important for the parties, the Justice Department and the Court to consider the thoughts presented in case there is some action they can take to address concerns expressed.

You know, Restore Our Creek was already underway when I heard about them and their mission and joined their efforts. I thought "now, restoring Silver Bow Creek, that's something to put effort into … something that will mean a lot to our children and grandchildren and all future Butte generations … something that can benefit our community right now in terms of improving our community aesthetics and improving our image … something that can help improve our community's economic opportunity … something that represents environmental justice … something that can help make amends for the century plus of environmental devastation that accompanied the economic upside of mining and smelting …"

As I saw it, restoring the creek was so important and had such an upside for Butte that making it happen became paramount to me, someone who has spent 40 years trying to make things better for Butte.

I LIKE MOST OF WHAT IS IN THE CD. THERE ARE PARTS OF IT I DON'T LIKE BUT, ON BALANCE, I SUPPORT ITS SIGNING AND URGE THE COURT TO LODGE THE CD AS SUBMITTED.

A number of the important things in the CD that were problematic, and needed to be rectified, could be done by action outside of the CD in the form of a Memorandum of Understanding discussed below. They needed to be taken care of, not with a kiss and a promise, but with some real action that assured Butte folks that their local government and the state were committed to getting it done and done right. I am speaking specifically about a path forward related to the restoration of Silver Bow Creek.

Before I joined them, ROCC already had the pulse of Butte's people. ROCC's three-fold mission statement of 1) removing the tailings, 2) restoring the first mile of the creek and 3) creating in that first mile a greenway and amenities to serve the public, represented the consensus thought of Butte folks. For over 5 years of ROCC

leadership and activities, that has continued to be true as hundreds and then thousands joined Restore Our Creek in creating and advancing the vision.

I am pleased that the CD parties at least partially responded to Restore Our Creek's call to action in ways that assist the well-being and long-term benefit to Butte and its people.

Tailings Removal

The long-term, rock hard position of the EPA and ARCO to not remove the tailings was changed after more than a decade. After a strong push from ROCC and the people, the Northside Tailings and Diggings East will be substantially cleaned up, along with some other spots. That's a victory for Restore Our Creek Coalition but, more important, a victory for Butte – A REASON TO SUPPORT THE CD.

Park/Greenway Amenities

When Butte folks, through Restore Our Creek Coalition, proposed the Silver Bow Creek Headwaters Park, we were met with skepticism at best by ARCO which had no plans for such a park and, for sure, was not going to pay for it. But, behind closed doors, THE REPRESENTATIVES OF BUTTE SILVER BOW AND THE STATE persuaded ARCO of the validity of the position of the people and ROCC. ARCO not only agreed to pay to develop a park plan that mirrored Restore Our Creek's, they agreed to pay for its construction. ANOTHER VICTORY FOR ROCC AND THE PEOPLE OF BUTTE.

Restoring the Creek?

But what about the most critical element of Restore Our Creek Coalition's mission, the most singularly important thing to the thousands of Butte folks who spoke through Restore Our Creek Coalition? Well, the restoration of the first mile of Silver Bow Creek from Texas Avenue to the confluence with Blacktail Creek essentially got a big goose egg from ARCO. A sliver of light, a small crack in the door, does exist in the CD language, providing something to work with. But many, including me, felt WE NEED A VEHICLE IN THE FORM OF A MEMORANDUM OF UNDERSANDING (MOU) THAT COMMITS THE LOCAL GOVERNMENT AND THE STATE TO PURSUING THE NEEDED ACTIONS IN THE SILVER BOW CREEK CORRIDOR.

ARCO started out against the creek restoration and they remain substantially opposed to this day. The pleadings of Butte Silver Bow and state negotiators ran into a solid wall of ARCO opposition. Because of that opposition, the provisions of the CD do not smooth the way for a creek restoration. In fact, the very limited references in the CD to restoring the creek appear to me to be carefully crafted impediments to creek restoration, even when they are sugar-coated with rhetoric. Thank God for the sliver of light.

It's not as though the ARCO or any of the negotiators were taken by surprise by Butte's demand for Silver Bow Creek restoration. The position of Restore Our Creek and Butte's people has never changed. Yet in virtually every step of the way the response from ARCO was "No!"

It was “no” when they first met with Restore Our Creek Coalition. It was “no” when the agreement in principle was negotiated and came out … “no” during all the public hearings and meetings … “no” when negotiating the actual CD language … “no” when the CD came out … and it remains “no” <u>except for that sliver of light</u>.

Now, we all knew that our local government wanted to see the creek restored. That had been repeated many times over by representatives of the government. But the local government was presented with a Hobson’s choice – “take what is available in the CD ‘as is’ or nothing at all.”

This dilemma presented a serious challenge. Most of the local government liked what was in the CD and wanted to secure it in place. But they were faced with a quandary about Silver Bow Creek. On the record, Butte Silver Bow, like most folks in Butte, wanted to have Silver Bow Creek restored, but the CD made that very difficult. The local government (and the people) were told it is a black and white, up or down, binary choice -- the CD as presented or nothing, or the decisions would come down to an EPA UAO (Unilateral Administrative Order) that would surely secure much less than the CD.

That Hobson’s choice given to the local government and the people of Butte was unfair, unnecessary and arbitrary. As to arbitrariness, there is nothing in the EPA’s CD process that requires parties like Butte Silver Bow to swallow an all or nothing choice. If we had discovered that language in the CD that imposed a $1 million a year cost on the county, the parties would have gone back into the negotiations and would fix the problem. If going back into negotiations would be possible in such a scenario, then going back to remove impediments on creek restoration was possible, too. Saying there was not a choice was arbitrary and designed to force a commitment to every word of the document, even if it left Silver Bow Creek restoration out in the cold.

As a citizen of Butte, I felt like someone was putting a gun to our head.

YET, I RESPECT THE CONCERNS OF THE PARTIES, INCLUDING THE LOCAL GOVERNMENT AND STATE, TO GET ALL OF THE GOOD IN THE CD IN PLACE. So, again, many of us suggested that we try to find a way, outside of the CD itself, to aggressively pursue Silver Bow Creek restoration, allowing the good things in the CD to advance. I and others in the ROCC lead group suggested that the state and Butte Silver Bow should sit down to craft and sign a memorandum of understanding (MOU) that lays out a plan that they can implement, consistent with the CD, to get us all to creek restoration over time, to assure the citizens of Butte that creek restoration will happen, that someone will be keeping an eye out to see that it is proceeding.

So, since ARCO’s impediment language appears to be here to stay in the CD, <u>we need to use the MOU vehicle to take advantage of that “sliver of light</u>,” to see that a restored Silver Bow Creek is in our future -- to insure that the state and county are committed to such action, something that is not in the CD itself.

Let me reiterate how important an “outside-the-CD” MOU is to insuring that the local government can achieve its dual goal of signing the Consent Decree AND advancing the restoration of Silver Bow Creek. AN MOU COULD RESULT IN COMMITTED ACTION BY THE STATE AND BUTTE SILVER BOW IN RESTORING THE CREEK WHILE STILL ADHERING TO THE CD ITSELF. IT IS A WAY WE CAN HELP ACHIEVE BOTH.

The MOU would represent the commitment of the two Montana public MOU parties (Butte and the State) to act together outside of the CD to keep the possibility of a creek moving forward for Butte's future, while maintaining consistency with the CD and without holding up signing the CD.

SO, I HAVE CONCLUDED THAT THE CD SHOULD BE SUPPORTED TO ACCOMPLISH ALL OF THE GOOD THAT IS IN IT. THUS, I SUPPORT THE CD.

That support includes my belief that an MOU as suggested can and will be adopted and we can look forward to a restored creek in Butte Silver Bow’s future.

I hope my faith in the state and local government to be developing a proper MOU is well-placed and it is in that frame of reference that I URGE APPROVAL OF THE CD.

Thank you.

EVAN D. BARRETT July 15, 2020

Endorsing the BPSOU Consent Decree and Formalizing A Path Forward To Restoring Our Creek

Comments from Restore Our Creek Coalition (ROCC)
for Review by the Court Adjudicating the BPSOU Consent Decree

July 14, 2020

Over the last five years the Restore Our Creek Coalition (ROCC) has asked Butte citizens to imagine the opportunities for remediating and restoring the first mile of Silver Bow Creek from Texas Avenue to Montana Street. Working with the community, our clear and consistent mission, supported in petitions signed by more than 3500 Butte residents, has been threefold: 1) remove mining contaminants in the Silver Bow Creek corridor, 2) create a greenway for pubic enjoyment, and 3) restore our creek. During this time, we've coordinated our efforts with all the involved parties (EPA, the State of Montana, BSB, and ARCO) to the Consent Decree (CD) for the Butte Priority Soils Operable Unit (BPSOU). The parties have now submitted the agreement embodied in the CD for legal and judicial review. This document constitutes our group's comments for that review.

From the moment when the parties presented ROCC with the outline of their Agreement in Principle and sought our support for it, we have done everything we could to get to "Yes". When the debate about whether to support the CD came before Butte's Council of Commissioners, **ROCC members spoke forthrightly to urge the Council to endorse the CD**, even though we had reservations about the negotiated agreement. In spite of those reservations, the negotiators had earned our support by transforming the original cleanup plans for the Upper Silver Bow Creek corridor from what they had been before the negotiated settlement was articulated in the Agreement in Principle and then the CD:

- We support the CD because it shows that our voices, and those of all the local businesses, government leaders, and citizens who agreed with us, made a difference. The CD revises the original plan that would have left contaminants in place throughout the corridor and **responds to our first objective by removing those contaminants.**
- We support the CD because it meets many features of our second objective: the CD includes **plans for a greenway** for public enjoyment in the corridor. ARCO and Butte-Silver Bow developed restoration plans that strongly mirror ROCC's original proposal for a greenway found in our comprehensive plan for a Silver Bow Creek Headwaters Park, which visualized the beneficial end uses of the remediated and restored site and reflected the active engagement of hundreds of Butte citizens and the written support of 3500 Butte residents.

And even though **the CD fails to embrace our third objective, to Restore Our Creek, *we still support the settlement***. This objective – the restoration of Butte's namesake waterway – has always been the central and the most ambitious portion of ROCC's expression of the wishes of Butte residents. The CD as written refers to the creek only as a future possibility, not an essential, required element of the cleanup that would give Butte back a resource that was taken from us by years of mining and smelting. In fact, the CD commits the existing Silver Bow Creek channel to be used for collecting contaminated stormwater.

To be sure, in the CD itself and its specific financial commitments, the negotiating parties acknowledge the community's expectations about the restoration of the first reach of Silver Bow Creek. Shortly before the CD was finalized, a detailed independent engineering analysis funded by EPA demonstrated

clearly that the reconstruction of Silver Bow Creek in the corridor among all the remedial works planned for the site *is technically feasible*. Furthermore, in the CD, BSB and ARCO reserved sections of land along the corridor for a future creek. Clearly, the parties have acknowledged within the CD the community's expectation that the job is not done unless Silver Bow Creek is conceived as part of the effort.

ROCC and the residents of Butte, while appreciative of all that the CD represents, still expect leaders in the State of Montana, BSB, and EPA to convert the vagueness seen in the CD's *Potential Lined Creek* section into actionable agreements that can move this effort into a framework that ensures the creek restoration project continues forward. To that end, ROCC expects that, to the extent the CD fails to meet our primary goal—to restore upper Silver Bow Creek under Remedy, our local, state, and federal leaders will find ways to keep the creek restoration project moving forward *outside the CD*. Moving forward requires the following actions:

1. ROCC has actively engaged with the State and BSB to help frame a Memorandum of Understanding (MOU) that basically allows BSB to become the "project proponent" named in the CD, and commits both parties to cooperatively pursue operational and resource issues that will help carry the creek-restoration project forward.
   Such a document will tell Butte folks that the parties are on board, without requiring changes to the language found in the CD. ***ROCC seeks assurance from the two other parties*** *to the agreement (EPA and ARCO) to work cooperatively on this project as required in the CD.*

2. The parties must account in their Remedial Design documents and Remedial Action plans for the major cost-savings to be achieved for creek restoration by coordinating the development of the creek with the dirt work that occurs in the corridor as part of Remedy.
   This will tell Butte folks that the negotiated settlement doesn't unnecessarily increase the future financial and technical obstacles to restoring the creek in the locations they've already set aside in their plans.

3. The State of Montana and Butte government with oversight of Restoration Recovery funds have already committed resources in the CD to *launch the creek restoration effort.* That commitment must be realized *while Remedial Work is underway* to ensure the current agreement doesn't just kick the can down the road.
   This commitment demonstrates to Butte residents that the dollars spent on the Parrot cleanup, supplemented with replace-to-restore NRD funds for the lined creek, leave Butte's Silver Bow Creek Corridor with the potential for a clean environment, as promised by our Constitution. While elements of this commitment are explicit in the text of the CD, ROCC is deeply concerned that Butte's needs for NRD (Natural Resource Damages Program) funds that had been withheld "until the CD has been signed" will be stymied by NRD's past commitment of most of its funds to other locations and its current reluctance to reallocate funds to Butte—whose environmental damages constituted the primary justification for the State's original NRD lawsuit.

Notwithstanding these three expectations that are designed to work *outside the framework of the CD,* ROCC expects the judicial review of the settlement to address a strictly legal issue built into the settlement's assumptions.

ROCC members have been surprised and dismayed by the settling parties' apparently unanimous disdain for the settled law decided by Judge Brad Newman in the case (*Silver Bow Creek Headwaters Coalition*

LLC v. State of Montana) of the name (and thus the identity) of *Silver Bow Creek—as waters of the state*. ROCC specifically asks those conducting legal review of the document how the State and BSB, who are legally required to follow Montana law and Montana's Constitution, can be parties to a negotiated settlement that includes as a key part of its remedial plan the continued degradation of Upper Silver Bow Creek by using its channel to collect and convey contaminated storm water. **We suggest that the CD could be simply amended to solve this glaring legal problem as part of Remedy by replacing the current channel with the lined one proposed in ROCC's plans and then legally assigning that new one the name of our creek.**

ROCC asks those reviewing whether the CD adequately complies with CERCLA's requirements regarding the expressed wishes of the community and regarding the legally binding affirmation of Silver Bow Creek as waters of the state to treat as unfinished business in the settlement process the *Potential Lined Creek* section of the CD (under ARARS rules). ROCC asks those conducting the settlement's legal review to recommend that the parties convert the section's ambiguous language into proactive commitments that make the restoration of Silver Bow Creek an actual work in progress.

The long, winding road leading to the current Consent Decree has given Butte a much-needed map forward for all our efforts to overcome the Superfund stigma, **and as we've said, ROCC supports the BPSOU Consent Decree**. But the final legal review now underway needs to address the "map's" shortcomings.

Whether it's done within the framework of the existing CD, or if legal review acknowledges obstacles in the existing CD that need to be addressed and amended, and if CD amendments can be made to achieve this goal, leaders we rely on to do right by our community must take action to meet our final goal. Our destination is not just a park or contaminants removal; our destination is a creek flowing from Texas Avenue to the confluence with Blacktail Creek, as it did years ago before it was taken away by mining and smelting.

Northey Tretheway
Spokesperson
Restore Our Creek Coalition (ROCC)

BUTTE-SILVER BOW
OFFICE OF THE CHIEF EXECUTIVE
Courthouse, 155 W. Granite Street, Suite 106
Butte, Montana 59701-9256

July 15, 2020

US DOJ-ENRD
P.O. Box 7611
Washington, DC 20044-7611

Federal Superfund Public Comment
P.O. Box 200901
Helena, MT 59620

RE: United States V. Atlantic Richfield et al. NO. CV 89-39-BU-SHE
Butte Priority Soils Operable Unit Consent Decree

To Whom it May Concern:

On behalf of the City and County of Butte-Silver Bow, I am submitting this cover letter and two attached documents as part of the public record for the US DOJ and Court to consider, in response to the call for public input regarding the Butte Priority Soils Operable Unit Consent Decree.

Over a three-month period, and in the midst of the COVID-19 pandemic, the City-County conducted a thorough and rigorous public information campaign to educate and inform our citizens about the content of the Consent Decree. Please refer to **Attachment 1** for a detailed description of the public meetings and opportunities offered, and process used to inform our residents.

In addition, and subsequently, the Butte-Silver Bow Council of Commissioners, the City-County's governing body, solicited public input before deciding to authorize (by a 10-2 vote) me to sign the CD on behalf of the local government. The Commissioners received more than 100 comments, the majority of which were in support of the CD and its proposed remedial actions; many letters provided detailed, thoughtful input, which was useful to the commissioners in their deliberation. Please refer to **Attachment 2** for a spreadsheet/list of citizens who submitted written comments or oral testimony, and a short annotation of their expressed position on the CD.

Thank you for your consideration.

Best Regards,

DAVID PALMER
CHIEF EXECUTIVE

CC: Eileen Joyce, Butte-Silver Bow County Attorney
John Morgan, Chairman, BSB Council of Commissioners

Attachment 1. Butte Priority Soils Operable Unit
Summary of Public Engagement, 2018 - 2020

- January 26, 2018 – EPA's Region 8 Administrator announced a conceptual settlement framework for completing the BPSOU remedial actions.
- April 2018 – The United States and Atlantic Richfield obtained a modification of the federal district court's confidentiality order, allowing consent decree parties to share information about the further cleanup plans for the BPSOU.
- May 30, 2018 – EPA publicly released a detailed Further Remedial Elements Scope of Work (EPA 2018b). Fact sheets were provided to explain various parts of the conceptual settlement framework and a public comment period was announced.
- May 30 and June 12, 2018 – Two public meetings were held at Montana Tech to further explain the Further Remedial Elements Scope of Work and to answer questions.
- July 11–12, 2018 – An information booth was staffed during the Folk Festival where presentation materials available from the May/June public meetings were displayed.
- August 7, 2018 – Two community design workshops were held by Atlantic Richfield in Butte.
- August 30, 2018 – The second set of the community design workshops was held by Atlantic Richfield.
- November 1, 2018 – The final community design workshop was held by Atlantic Richfield and presented the outcome of the two-part design charette workshops.
- April 11, 2019 – EPA released a proposed plan for amending the 2006/2011 BPSOU Record of Decision, placed the administrative record in the Montana Tech Library and on EPA's website, published a notification of the availability of the proposed plan and administrative record in the Montana Standard and the Butte Weekly, and distributed a fact sheet.
- April 23, 2019 – EPA held the first of two public meetings on the proposed plan at which EPA and Montana DEQ answered questions and took formal public comment.
- May 20, 2019 – Atlantic Richfield and Butte Silver Bow County shared their joint end land use plan describing amenities planned for the area above the confluence of Silver Bow Creek with Blacktail Creek.
- May 23, 2019 – EPA held the second of two public meetings on the proposed plan.
- May 30, 2019 – Butte-Silver Bow hosted a listening session to summarize EPA's proposed plan.
- September 2019 – EPA awarded CTEC an amended grant award to provide for CTEC's evaluation of end land use possibilities in the area above Silver Bow Creek's confluence with Blacktail Creek to Texas Avenue, including the possible construction of a lined, meandering creek in this area.

- February 13, 2020 – All CD Parties release the entire proposed CD.
- February 14, 2020 – A special four page insert was shared with the community to describe the CD and ROD Amendment.
- February 18, 2020 – Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 18, 2020 – Kiwanis and Burros presentations from CD Party representatives.
- February 19, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 20, 2020 – Rotary Club presentation from the CD Party representatives.
- February 20, 2020 – Public Education Open House and dialogue.
- February 21, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 21, 2020 – North Western Energy Open House presentation from the CD Party representatives.
- February 24, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 24, 2020 – BSB and AR staff meet with Timber Butte residents to complete a walk through at Copper Mountain Park.
- February 25, 2020 – Public Education Open House and dialogue mid-day.
- February 25, 2020 - Public Education Open House and dialogue evening.
- February 26, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 26, 2020 – Public Education Chamber "Lunch and Learn".
- February 27, 2020 – Public Presentation on "End Land Use".
- March 4, 2020 – Council Meeting BSB presentation of CD
- March 9, 2020 – District 9 commissioner meeting specific to Timber Butte Repository
- March 10, 2020 – District 1 CD Party representatives presentation of CD.
- March 2January 26, 2018 – EPA's Region 8 Administrator announced a conceptual settlement framework for completing the BPSOU remedial actions.

- April 2018 – The United States and Atlantic Richfield obtained a modification of the federal district court's confidentiality order, allowing consent decree parties to share information about the further cleanup plans for the BPSOU.
- May 30, 2018 – EPA publicly released a detailed Further Remedial Elements Scope of Work (EPA 2018b). Fact sheets were provided to explain various parts of the conceptual settlement framework and a public comment period was announced.
- May 30 and June 12, 2018 – Two public meetings were held at Montana Tech to further explain the Further Remedial Elements Scope of Work and to answer questions.
- July 11–12, 2018 – An information booth was staffed during the Folk Festival where presentation materials available from the May/June public meetings were displayed.
- August 7, 2018 – Two community design workshops were held by Atlantic Richfield in Butte.
- August 30, 2018 – The second set of the community design workshops was held by Atlantic Richfield.
- November 1, 2018 – The final community design workshop was held by Atlantic Richfield and presented the outcome of the two-part design charette workshops.
- April 11, 2019 – EPA released a proposed plan for amending the 2006/2011 BPSOU Record of Decision, placed the administrative record in the Montana Tech Library and on EPA's website, published a notification of the availability of the proposed plan and administrative record in the Montana Standard and the Butte Weekly, and distributed a fact sheet.
- April 23, 2019 – EPA held the first of two public meetings on the proposed plan at which EPA and Montana DEQ answered questions and took formal public comment.
- May 20, 2019 – Atlantic Richfield and Butte Silver Bow County shared their joint end land use plan describing amenities planned for the area above the confluence of Silver Bow Creek with Blacktail Creek.
- May 23, 2019 – EPA held the second of two public meetings on the proposed plan.
- May 30, 2019 – Butte-Silver Bow hosted a listening session to summarize EPA's proposed plan.
- September 2019 – EPA awarded CTEC an amended grant award to provide for CTEC's evaluation of end land use possibilities in the area above Silver Bow Creek's confluence with Blacktail Creek to Texas Avenue, including the possible construction of a lined, meandering creek in this area.
- February 13, 2020 – All CD Parties release the entire proposed CD.
- February 14, 2020 – A special four page insert was shared with the community to describe the CD and ROD Amendment.

- February 18, 2020 – Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 18, 2020 – Kiwanis and Burros presentations from CD Party representatives.
- February 19, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 20, 2020 – Rotary Club presentation from the CD Party representatives.
- February 20, 2020 – Public Education Open House and dialogue.
- February 21, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 21, 2020 – North Western Energy Open House presentation from the CD Party representatives.
- February 24, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 25, 2020 – Public Education Open House and dialogue mid-day.
- February 25, 2020 - Public Education Open House and dialogue evening.
- February 26, 2020 - Community Coffee was set up to have discussions with the public that had certain interests or issues and wanted to have dialogue with CD Party members.
- February 26, 2020 – Public Education Chamber "Lunch and Learn".
- February 27, 2020 – Public Presentation on "End Land Use".
- February 28, 2020 – BSB staff attend coffee with Commissioner Michele Shea and constituents of District 2.
- March 3, 2020 – BSB staff present Consent Decree to Berkshire Hathaway realtors.
- March 4, 2020 – BSB staff present Consent Decree to Kiwanis.
- March 4, 2020 – Council Meeting BSB presentation of CD.
- March 6, 2020 – BSB staff attend coffee with Commissioner Bill Anderson and constituents of District 10.
- March 9, 2020 – District 9 commissioner meeting specific to Timber Butte Repository.
- March 10, 2020 – District 1 CD Party representatives presentation of CD.
- March 11, 2020 – BSB staff present Consent Decree to City-County employees.

- March 13, 2020 – BSB Staff attend coffee with Commissioner Michele Shea and constituents of District 2.
- April 15, 2020 – Council of Commissioners initiates public comment period.
- May 6, 2020 – Council of Commissioners closes public comment period.
- May 20, 2020 – Council of Commissioners vote to approve Chief Executive Palmer to sign the Consent Decree.

Attachment 2. Public Comments on the BPSOU Consent Decree
To Butte-Silver Bow Council of Commissioners
To be entered into the record on April 15, 2020 and May 6, 2020

No.	Date Submitted	Name	Address	Council District	Annotated Comment
1	03/04/2020	Mike Paffhausen	1500 Harrison Ave	All	Yes to sign CD; content favorable to BSB.
2	03/18/2020	Joe Griffin, Hydrologist	1121 W. Diamond St.	9	Yes to approve CD; trust science; lots of public input.
3	03/25/2020	Pat Prendergast	1017 W. Porphyry St.	9	Delay until in-person public comments; CD must include creek.
4	03/31/2020	Dr. John Ray	915 W. Galena St.	10	Yes to virtual meetings; adequate public process for input.
5	04/01/2020	Steve Wellman	41 N. Lake Dr.	1	Yes to CD; followed process, supports moving forward.
6	04/01/2020 04/15/2020	Mike Paffhausen	1500 Harrison Ave	All	Yes to sign CD; trust engineers & professionals; greatest economic revitalization of a superfund community; support on behalf of silent majority of business community; 90% of community is behind a yes vote.
7	04/01/2020 04/14/2020	Don Foley	17 Wells St.	12	Delay until in-person public comments; hire legal expert review; CD must include creek; no contaminated material in neighborhoods.
8	04/01/2020	Evan Barrett	807 W. Silver St.	10	Delay signing CD until in-person public comments.
9	04/08/2020	Mark St. Pierre	1117 W. Broadway St.	11	Yes to accept and implement CD.
10	04/09/2020	Dave Williams, CTEC	City-Countywide	All	Yes to sign CD; favorable for BSB; time is of the essence.
11	04/10/2020	Dr. John Ray	915 W. Galena St.	10	Yes to sign CD; favorable for BSB; time is of the essence.
12	04/07/2020	Dan Villa	146 Whisper Ridge	5	Yes to sign CD; favorable for BSB; time is of the essence.
13	04/10/2020	Debbie K. Smith	3400 Hill Ave, Legion Oasis	6	Yes to sign CD; favorable for BSB; time is of the essence.
14	04/10/2020	Dan & Michele Miles	36 N. Lake Dr.	1	Yes to sign CD; the sooner the better.
15	04/10/2020	Rick Edwards	13 Burning Tree Lane	1	Yes to sign CD; proposal achieves goals of cleanup for Butte.
16	04/11/2020	Mark Thompson, for George Grant Chapter, Trout Unlimited	Butte	all	Approve the CD without delay; yes or no vote, no vote or delay lost opportunity for best possible cleanup; GGTU represents 214 engaged and concerned and environmentally active members.
17	04/13/2020	Rep. Jim Keane	2131 Wall Street	4	Yes to sign CD; includes much public input; good for Butte.
18	04/13/2020	Dr. John Ray	915 W. Galena St.	10	Shorter version of 4-10-20 letter; yes to sign CD.
19	04/13/2020	Fritz Daily	1901 Roosevelt St.	6	Don't sign CD; does not include creek; big mistake.
20	04/14/2020	Cassie Wick	820 W. Mercury St.	10	Yes to the CD, put CD in action as soon as possible, I trust those who have dedicated themselves to this project.
21	04/14/2020	Marc Murphy	3029 Atherton Lane	1	Yes to the CD, has reviewed the documents, in Butte's best interest, is an environmental engineer, let's get it signed promptly, enough talking and negotiating.

No.	Date Submitted	Name	Address	Council District	Annotated Comment
22	04/14/2020	Bobbi Stauffer	1253 W. Aluminum St.	9	Yes to CD without delay; protects human health and environment; long term monitoring; focus on what good is in agreement; storm water management and amenities; a true bright spot during this pandemic.
23	04/14/2020	Brad Archibald, P.E.	2817 State Street	2	Yes to CD; Consensus of highly qualified people; good for the environment and health, jobs, time to move forward.
24	O4/15/2020	Jenny Heglund	383 Whisper Ridge	5	Yes to CD; protects and restores riparian areas; protects our health; enhance Butte's appearance; sign it now.
25	04/15/2020	Erin Downey	Butte		Yes to CD.
26	04/15/2020	Kayt Downey	Butte		Yes to CD.
27	04/15/2020	Karen Byrnes	311 Galaxy Drive	1	Yes to CD without delay; thoroughly vetted, amenities and jobs.
28	04/15/2020	Molly Connors	Butte		Yes to CD; we need this, Butte needs this.
29	04/14/2020	Bill Joyce, Joyce & McDonald	100 E. Broadway St.	11	Yes to CD; Sarta has received extensive briefings and invited public input; CD parties listened to public input and deficiencies identified: tailings removed; stormwater management to protect surface water; RMAP expansion; AR pays not taxpayers, sign CD and control our future.
30	04/15/2020	Kevin Heglund	383 Whisper Ridge	5	Yes to CD; trees, trails not heavy metals; great space in the middle of town.
31	04/15/2020	Linda Trevenna	3475 St. Ann Street	3	Issue of Silver Bow Creek starting at Texas has not been addressed.

The week of April 20 -24.

No.	Date Submitted	Name	Address	Council District	Annotated Comment
32	04/15/2020	Megan Babin	Butte		Yes to CD; makes Butte's future and local environment a confident known; believe in Butte its past and future vote yes.
33	04/15/2020	Dale Malyevac	Butte		Yes, to CD; would like to support the consent decree as currently written.
34	04/15/2020	Patrick Sampson	3245 Burlington	1	Yes to CD; Columbia Basin LLC supports the CD.
35	04/19/2020	John Reynolds	2840 Yale Ave	2	Yes to CD; Agrees with Judge Newman ruling on the Silver Bow Creek Headwaters Coalition
36	04/19/2020	Rebeca Tamietti	Butte		Yes to CD; Agrees with Judge Newman ruling on the Silver Bow Creek Headwaters Coalition
37	04/19/2020	Julie Buckley	2010 Gaylord Street	7	Yes to CD; Agrees with Judge Newman ruling on the Silver Bow Creek Headwaters Coalition
38	04/15/2020	Mark Hodges	Butte		Agrees with Judge Newman ruling on the Silver Bow Creek Headwaters Coalition

39	04/20/2020	Erin Leber	Butte		Yes to CD; and asks for your support in moving forward with the CD.
40	04/21/2020	John Ray	915 Galena St.	10	Yes to CD; Economic forces over which Butte has little control mandate a quick approval of the CD. Delay is dangerous.
41	04/20/2020	Shanna Adams, P.E.	75 Alyvia Lane	3	Yes to CD; Support of the council signifies support by the people.
42	04/21/2020	Mark Mariano	Butte		Yes to CD; Don't be ridiculous and sign and support the CD.
43	04/22/2020	Mary Sutherland	105 O'Brien Lane	1	Yes to CD; I write in strong support of the CD. Butte is in some desperate need of some action.
44	04/19/2020	Les Cook, Chancellor	1301 W. Park St.	10	Yes to CD; on behalf of Montana Tech University. Support moving forward without delay.
45	04/23/2020	David Williams	2731 Princeton St.	2	Yes to CD; I urge the council to approve the CD and have Chief Executive Palmer sign on behalf of the county.
46	04/23/2020	Stephen Hinick, AIA	100 E. Broadway	10	Yes to CD; is in support of the CD, very impressed with the time, effort and thought that has gone into compiling and issuing the CD.
47	4/23/2020	Lee Whitney	3151 Quincy St.	1	Yes to CD; it's time for our community to take a stand and resolve the issue.
48	4/24/2020	Travis McAdam	61 Wathena Drive	9	Yes to CD; encourage that you approve the CD, the county has held many sessions and the public has had numerous opportunities to comment.
49	4/24/2020	Mike Patterson	1150 Steele St.	9	Please approve the CD without delay. We have heard enough comments and now is the time to move rapidly.
50	4/24/2020	Steve McGrath	1950 Locust St.	4	Yes to CD; Please act responsibly and quickly in approving the CD.
51	4/24/2020	Colleen Elliott	1231 W. Quartz St.	11	Yes to CD; I believe the CD is a reasonable compromise that will result in a good remedy. It is time to sign off and get the cleanup done.
			WEEK 4/27/-5/6/2020		
52	4/24/2020	Mark Mariano	Butte		Yes to CD; You have the best of what has come from the CD to help our town turn a corner and move forward.
53	4/30/2020	Joe Griffin	1121 Diamond St	9	Addressing Judge Newman's statement at the last meeting.
54	4/30/2020	Steve Wellman	41 North Lake Dr.	1	Yes to CD; my urgent support asking you to pass the CD .
55	5/1/2020	Mathew Larson	Butte		Yes to CD; Waiting to approve the CD is reckless. It is in the best interest of all of us in Butte to take a step forward and approve this CD.
56	5/1/2020	John and Bonnie Lundborg	3368 Jerry Ck Rd., Wise River MT	12	Yes to CD; We urge you to approve the CD.
57	5/1/2020	Phyllis Costello	1219 Porphyry St.	9	Yes to CD; Approving this is vital to Butte's future.
58	5/4/2020	Kristen Rosa	318 Galaxy Drive	1	Yes to CD; There is no need to sit on this important issue.

59	5/4/2020	Nicholas Tucci	1034 Caledonia St.	11	Yes to CD; I urge the Council to recognize the gift horse that his CD truly is.
60	5/4/2020	Larry Smith, Phd	27 N. Excelsior St.	10	Yes to CD; please sign it as soon as possible.
61	5/4/2020	John Ray, Phd	915 Galena St.	10	Yes to CD; I urgently ask that you schedule a vote at the earliest opportunity.
62	5/4/2020	John Ray, Phd	915 Galena St.	10	Yes to CD; I urge the Council to set a vote on the CD no later than May 20,
63	5/4/2020	Sid DeBarathy	127 Renz Drive	1	I support Brad Newman's ruling on the SB Ck, and also requiring Atlantic Richfield to be held accountable.
64	5/4/2020	Karla Hart	Butte		I support Brad Newman's ruling
65	5/4/2020	Phil and Lavone Dallas	Butte		Vote to support Restore our creek and the issues Fritz Daily reviews
66	5/4/2020	Fritz Daily	1901 Roosevelt St.	6	No to CD; The Council has a tremendous opportunity to become an essential player in this process by rejecting the CD.
67	5/4/2020	Marianne Schappek	1225 W. Quartz St.	11	I support Brad Newman's ruling.
68	5/4/2020	Joe Griffin	1121 W. Diamond	9	Yes to CD; It is time to move to the final phase of Butte Superfund.
69	5/4/2020	James Madison	116 W. Silver St.	9	Yes to CD; I agree it is time to move to the next phase and approve the CD.
70	5/4/2020	Roy Morris	2901 Quincy St.	1	Yes to CD; let's get to work making Butte the best city in Montana.
71	5/4/2020	Bev Hartline, Phd & Fredrick Hartline, Phd	340 Telluride Ridge	11	Yes to CD; we urge the Council to approve the CD on behalf of BSB.
72	5/4/2020	Mary Sutherland	1703 Whitman	7	Yes to CD; Don't let Restore Our Creek hurt Butte's future with their weak intended objection to the CD or the future ability to truly restore SB creek.
73	5/4/2020	Chris Gammons	1231 W. Quartz	11	Yes to CD; I support the CD and hope that it is approved.
74	5/4/2020	Joseph Adams	W. Broadway St.	10	Yes to CD; the CD represents an opportunity to close a long and contentious chapter in the history of Butte.
75	5/4/2020	Dave Schultz, P.E.	1201 W. Copper St.	11	Parrot Tailings should not have come out, lined creek not a good idea
76	5/5/2020	Paul Babb	3601 Elizabeth Warren Ave.	1	Yes to CD; I support for the governing body to approve the CD.
77	5/5/2020	Robert Pal, Phd	1131 W. Silver St.	9	Yes to CD; Butte need this CD and cannot afford to lose the progression of this unique opportunity and the funding associated with it.
78	5/5/2020	Mike Potts, P.E.	1111 W. Diamond	10	Yes to CD; it is not perfect but by far, but the best option to the alternative UAO, where we would all lose.
79	5/5/2020	Jim Fay	1927 Monroe	3	Yes to CD; I am mostly in favor of the proposed CD with certain reservations.
80	5/5/2020	Ray Rogers, Praxis Center	Butte		Yes to CD; I am in support of signing the CD.

81	5/5/2020	Doug Coe	1031 Caledonia St.	11	Yes to CD; Ultimately I believe the Council should approve the CD.
82	5/6/2020	Terry Schultz	2210 Elm Street	4	I support Judge Newman's opinion concerning SB creek.
83	5/6/2020	Sherry Vogel	1121 W. Diamond St.	9	Yes to CD; Please vote to approve the CD.
84	5/6/2020	Mathew Stajcar	Butte		Yes to CD; The economic activity that will result from the CD is yet another reason that I support the CD.
85	5/6/2020	MaryLou Zimmerman	1027 Hornet St.	11	Yes to CD; I am writing to urge the Council of Commissioners to support and sign the CD.
86	5/6/2020	Brandon DeShaw	11 Bittersweet Dr.	1	Yes to CD; Please enter this letter into the record, as support for approving the CD.
87	5/6/2020	John Sandford	3420 N. Hillcrest St.	3	Yes to CD; I support the CD from what I have learned from the public meeting.
88	5/6/2020	Tom Michalek	1218 W. Woolman St.	11	Yes to CD; I strongly advise the Council to approve the CD as currently presented and negotiated by the parties.
89	5/6/2020	Casey Hackathorn, Montana Trout Unlimited	Missoula, MT		Yes to CD; Trout Unlimited supports approval of the CD. This agreement is long overdue and it's time to begin implementing the remedy that Butte deserves.
90	5/6/2020	Karen Knudsen	Missoula, MT		Yes to CD; We urge you to sign on behalf of the Clark Fork Coalition.
91	5/6/2020	Ben Sorensen, P.E.	1029 Beef Trail Rd.	5	Yes to CD; I am writing in support of BSB entering the proposed CD for the BPSOU with AR as outlined in Civil Action No .CV89-039-BU-SHE.
92	5/6/2020	Patricia Gallery, AR	317 Anaconda Rd.	11	Yes to CD; Atlantic Richfield encourages the BSB Council to approve the CD, and request that her letter be read into the record.
93	5/14/2020	Fritz Daily	1901 Roosevelt St.	6	No to CD; re-asserts opposition.
94	5/16/2020	Frank Boroni	3220 Hannibal St.	1	No to CD; there is and always has been a Silver Bow Creek.
95	5/18/2020	Mary Kay Craig	518 W. Granite St.	11	No to CD; many questions about action levels and remedial goals.
96	5/18/2020	Dr. John Ray	915 W. Galena St.	10	Yes to CD.
97	5/13/2020	Steve Kujawa	1852 Florida St.	4	Yes with suggestions/no ponds.
98	5/19/2020	R.E. Banderob	2601 Grand Ave.	4	Yes to CD.
99	5/20/2020	Barb Gregovich	1301 Porphyry St.	9	Yes to CD.
100	5/20/2020	Matt Vincent	1201 Porphyry St.	9	Yes to CD; based on the good input from experts and those involved.
101	5/5/2020	Ryan Lynch	3141 Burlington St.	1	Yes to CD; many good results for Butte moving forward with CD.
	5/6/2020	Evan Barrett, Sister Mary Jo McDonald, Ed Simonich, Mary Kay Craig, Doug Coe, Don Peoples,	Oral Testimony via video, Butte Council of Commissioners		Yes but requested MOU between State and Butte-Butte-Silver Bow Regarding the lined creek.

		Northey Tretheway, and Bill McGregor on behalf of Restore Our Creek Coalition and Individually			
	4/15/2020	Former Judge Brad Newman	Phone Testimony		CD is good but could create a legal issue for county.
	4/15/2020	Bob Brock	Phone Testimony		Commentary on scientific analysis of waivers.

Habitat for Humanity® of Southwest Montana

Building houses, building hope

Assistant Attorney General
US DOJ – ENRD
PO Box 7611
Washington DC 20044-7611

July 15, 2020

And Montana DEQ

RE: Comment on the Consent Decree for the Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund Site

While blood lead levels in children in Butte Silver Bow have been reduced - in part by the Residential Metals Abatement Program - Butte Silver Bow has clear indicators of stressed human health. Its suicide rate is more than double the national rate. Compared to Montana state averages, it has more developmentally disabled students, and a significantly higher percentage of disabled adults under age 65. It has lower adult life expectancy, particularly compared to neighboring major cities. Underwriting projects have shown significant chronic diseases and neurologic interference known to be common in locations with heavy lead pollution.

Citizens have pinned hopes for health improvements on the environmental cleanup promised by Superfund. Yet, when the final Consent Decree was decided, inadequate lead action levels were left in place, adopted based on contested science prior to the 2006 Record of Decision. It has been acknowledged by the EPA and other experts that there is no safe level of lead exposure. While public comments have called repeatedly for collection of health based data for use as a baseline or to inform the cleanup, this has never been accomplished, and no explanation has been given.

In our public comments reviewed by EPA, our organization asked that the residential cleanup action level be set at the same level as that adopted for the nation under housing regulation – 400 parts per million for children's play areas. Butte's level under the consent decree is far higher – 1200 ppm. The answer we received was unclear and contradictory. It noted that the state of Montana could recommend a lower action level if residents prove health impacts in the future. But no justification was given for why Butte should be singled out for a 200 percent increase in pollution exposure compared with nearby Anaconda, which was given a 400 ppm action level for residential clean up purposes of the same pollution source – the Anaconda smelter. In Butte, the smelter dust is found in attics and is cleaned if it measures above 1200 ppm under the Residential Metals Abatement Program (RMAP) referenced in the CD.

Our organization represents very low income citizens who deserve a clean and healthy environment to live and raise children, and we ask that national housing standards currently in place be referenced

without excluding Butte through reference to disputed science behind 2006 ROD. Citizens should be given the flexibility to request that Butte not be left behind through an inadequate residential cleanup that will leave as much as 40 percent of the target properties unaddressed by exceeding the national recommendation for lead exposures for children. **Hidden lead health hazards should not be left to sicken future generations.**

Habitat is building housing on the ground with the principal responsible party Butte Silver Bow, and Habitat requests that the CD allow Butte flexibility to address this inequity through careful management of cleanup investments left to the city-county for implementation.

In response to our written concerns about the action level, EPA states it will "work directly with HUD and other stakeholders to verify that loans or other forms of assistance are not hindered by the lead action level in Butte. If there is specific instances where such assistance is hindered, residents should contact the Butte Silver Bow local government and the EPA remedial project manager for help in solving the problem." This statement offers the residents no protection from action levels that exceed recognized scientific levels, other than EPA will help somehow solve the "problem."

Strong armed interagency relations are no substitute for consumer protections such as action levels protective of human health. Because there is no "safe" level of lead in the blood, a more aggressive approach is requested. Butte is currently relying on exceedance of reference blood lead levels in children to identify the polluted homes for remediation. We would like to see this process reversed **by adopting an action level that insures effective remediation of residential properties PRIOR to occupancy by children.**

The EPA response to Habitat's concerns is wholly insufficient. We urge the court to remedy this situation at this time by requiring the EPA and HUD recommended residential action level of 400 ppm lead. Many citizens would prefer a lower action level and the resulting improvements in human health compared to the superficial amenities offered along with the consent decree.

Most Sincerely,

Barbara Miller
Project Director

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Memorandum of Understanding

This Memorandum of Understanding (MOU) is entered into on _____, 2020 (the "Effective Date"), by and between the State of Montana, located at the Montana State Capitol, Helena, MT 59620 (hereinafter referred to as the "State"), and the City and County of Butte-Silver Bow, Montana, located at 155 W Granite Street – Butte, MT 59701 (hereinafter referred to as "BSB").

_____

R E C I T A L S

WHEREAS, in February 2020, the United States Environmental Protection Agency (EPA) released a proposed Consent Decree (CD) for the Butte Priority Soils Operable Unit (BPSOU) in Case No. CV-89-39-BU-SEH, and associated Record of Decision amendments; and

WHEREAS, Governor Bullock announced in late 2015 that the state was moving ahead with the Parrot Tailings removal under its authority to address a significant source of groundwater contamination to Silver Bow Creek and the watershed downstream, overcoming an impasse and reaching agreement on work within the CD to conduct additional mine waste removals, address floodplain contamination from Silver Bow and Blacktail Creeks, manage stormwater pollution, and capture and treat additional contaminated groundwater to prevent negative impacts to the creeks; and

WHEREAS, BSB and the State have agreed to the terms and provisions of the proposed CD, and along with the other signatories, have lodged it with the U.S. District Court for the District of Montana for public comment, and after full consideration of and response to public comments received, will then ask the court to enter it as a judicial decree under applicable legal standards; and

WHEREAS, the proposed CD provides a framework for a feasible, permanent, sustainable remedy that protects human health and the environment in Butte, and resolves significant long-standing disputes over remedy options and who should pay for them; and

WHEREAS, an important community priority for the CD, as strongly expressed through public participation and community engagement, has been to coordinate the required remedy actions with restoration actions, particularly in the upper Silver Bow Creek and Blacktail Creek corridors; and

WHEREAS, Appendix D, Attachment C, Addendum 1 to the proposed CD outlines commitments to develop end land uses in the Silver Bow/Blacktail Creek Corridor, intended to create community desired amenities coordinated with the remedial and restoration actions of others; and

WHEREAS, an independent engineering study preliminarily affirmed the feasibility of constructing a lined creek channel in upper Silver Bow Creek from Texas Avenue to its confluence with Blacktail Creek along with the remedial actions proposed in the CD for the corridor; and

WHEREAS, the State has made commitments to set aside a portion of the "Butte Site Account" settlement funds from the CD to support the feasibility assessment, design and/or construction of a

lined creek and other priorities of the community as outlined in current Restoration Plans (and any amendments thereto) following the successful completion of remedial work at Blacktail Creek under the terms of the CD; and

WHEREAS, following remedial actions at Blacktail Creek, remaining funds from the Butte Site Account will be repaid in accordance with 2019 amendments to the Upper Clark Fork River Basin Aquatic and Terrestrial Resources Restoration Plan, the Butte Groundwater Restoration Plan and the Butte Area One Restoration Plan, and subsequently, those funds are anticipated to afford significant opportunities to invest in priority Silver Bow/Blacktail Creek Corridor restoration actions that complement remedial actions identified for the BPSOU; and

WHEREAS, the State and BSB wish to affirm these commitments as well as their intentions to facilitate restoration projects in Butte through additional community engagement, and concerted efforts to coordinate remedial design considerations and restoration actions.

NOW THEREFORE, BE IT RESOLVED that this Memorandum of Understanding is made by and between the State and BSB to affirm mechanisms for public participation, restoration planning and implementation, and remedy/restoration coordination and implementation according to the following terms and conditions:

1. BSB and the State pledge to take actions, independently and jointly, in pursuit of the planning, design, engineering, construction and maintenance of projects in the floodplain corridors above the confluence of upper Silver Bow Creek and Blacktail Creek and surrounding tributaries, including, but not limited to, a lined creek channel, riparian habitat improvements, trail connections to adjoining neighborhoods, and other priorities of the community, consistent with current Restoration Plans (and any amendments thereto) governing funding allocations of the State and the CD.

2. The State and BSB pledge to work cooperatively with the Atlantic Richfield Company (AR) and the EPA to make all reasonably practicable efforts to allow for coordination of restoration projects with remedy projects within, and in proximity to, the BPSOU, and will request AR and EPA to provide for an end land use condition and other improvements that allow for the construction of a lined creek between Texas Avenue and its confluence with Blacktail Creek, consistent with the CD and the End Land Use Addendum in Appendix D.
3. Subject to the terms outlined in the proposed CD (including Paragraphs 20 and 21, and Appendix D, Attachment C, Addendum 1,), and affirmed by the Governor's representative on February 13th and March 4th 2020, the State shall ensure that $1 million and any associated accrued interest from the Butte Site Account will be made available to BSB for potential projects in the Silver Bow Creek corridor, following completion of remedial work planned for Blacktail Creek, including, but not limited to, a lined creek channel, riparian habitat improvements, trail connections to adjoining neighborhoods, and related priorities of the community.

4. BSB and the State agree to involve the public in the decision-making process on end land use and restoration projects under their respective authority in the creek corridors.

5. BSB and the State will examine and, if appropriate, pursue funding from other sources, public and private, for Silver Bow/Blacktail Creek corridor projects as outlined above to

complement and augment any funding prioritized and legally available from applicable settlements and restoration plans.

6. BSB and the State agree that the "project proponent" (as referenced in the CD) bringing forth Silver Bow Creek corridor projects, including a lined-creek project as described, can be BSB, if that is deemed by BSB to be the best way to advance SBC restoration.

Legal Compliance

A. **Responsibilities of the Parties.** The State and BSB and their respective agencies and offices will handle their own activities and utilize their own resources, including the expenditure of their own funds, in pursuing the stated objectives of this MOU. Each party will carry out its separate activities in a coordinated and mutually beneficial manner.

   The Parties acknowledge and understand that they must be able to fulfill the responsibilities under this MOU in accordance with the provisions of the CD, the law and regulations that govern their activities. Nothing in the MOU is intended to negate or otherwise render ineffective any such provisions or operating procedures. The Parties assume full responsibility for their performance under the terms of this MOU.

   If at any time either Party is unable to perform their duties or responsibilities under this MOU consistent with such Party's statutory and regulatory mandates, the affected Party shall immediately provide written notice to the other Party to establish a date to meet and discuss resolution of the matter.

B. **Participation in Similar Activities**. This instrument in no way restricts the State or BSB from participating in similar activities with other public or private agencies, organizations, and individuals.

C. **Limitations.** Nothing in this agreement shall be construed to limit, modify, or otherwise affect the authority granted by law to the Governor, any department, agency, political subdivision, officer, agent, or employee of the State of Montana or any officer, agent, employee or office of the City and County of Butte Silver Bow. This agreement is intended to supplement and not to supersede or modify any legally binding document (including without limitation the Consent Decree and restoration plans), and in the event of a conflict those legally binding documents shall control. This agreement is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the State of Montana, its departments, agencies, or entities, its officers, employees, or agents, or any other person, including the officers, employees and offices of the City and County of Butte Silver Bow.

D. **Expiration and Termination.** This MOU shall terminate ten years after the Effective Date, unless otherwise extended by mutual, written consent of the Parties.

E. **Governing Law.** This MOU shall be governed by and construed in accordance with the laws of the State of Montana.

F. **Authorization and Execution.** The signing of this MOU does not constitute a formal undertaking, and as such it simply intends that the signatories shall strive to reach, to the best of their abilities, the objectives stated in this MOU.

This agreement shall be signed by Chief Executive Dave Palmer for Butte Silver Bow, and Governor Steve Bullock for the State of Montana, and shall be effective as of the later of the date that both parties have signed this agreement and the U.S. District Court for the District of Montana enters the CD.

_____ _____

DAVE PALMER Date
Chief Executive
Butte Silver Bow Local Government

_____ _____

STEVE BULLOCK Date
Governor
State of Montana

Attachment C: 2019 Surface Water Technical Impracticability Evaluation Report

1917400 - R8 SDMS

U.S. Environmental Protection Agency

Surface Water Technical Impracticability Evaluation
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site
Butte, Montana

November 2019

Executive Summary

Introduction

This report presents an evaluation of the technical impracticability (TI) of attaining certain aquatic life water quality performance standards in surface water within the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site in Butte, Montana (hereinafter "BPSOU"). This evaluation considers a variety of remedial actions, including certain stormwater control measures intended to reduce impacts to surface water; presents a detailed analysis of practicable future measures; and models potential outcomes of the actions. Modeled potential future conditions are compared to water quality performance standards to determine if it is technically practicable to attain the standards. This TI evaluation is primarily aimed at wet weather control and attaining acute aquatic life surface water applicable or relevant and appropriate requirements (ARARs). This TI evaluation also considers implementation of portions of the selected remedy not yet completed that are intended to meet chronic aquatic life surface water quality performance standards and the technical practicability of meeting those standards as a result.

Site Description

The Silver Bow Creek/Butte Area NPL Site, which includes the BPSOU, represents one of four contiguous Superfund sites in the upper Clark Fork River basin that extends 140 miles from the headwaters of Silver Bow Creek (SBC) north of Butte to the Milltown Reservoir near Missoula, Montana. The BPSOU encompasses an area of approximately 5 square miles.

Throughout the years, various historic mining activities occurred within the BPSOU resulting in numerous response actions as part of the cleanup work at the BPSOU. Contaminants, including arsenic and metals such as cadmium, copper, lead, mercury, and zinc, have been identified at the site as a result of 120 years of hard rock mining, smelting, milling, and other processing activities. Each waste type can result in surface water contamination.

Conceptual Site Model for Surface Water

Chronic aquatic life performance standards apply during base flow and normal high flow regimes. Acute aquatic life performance standards apply during wet weather conditions.

The main elements of the conceptual site model (CSM) for base flow and normal high flow include the following:

<u>Sources</u>:

- Mine waste (waste rock and tailings and other contaminated areas) via groundwater input
- Metals-laden sediment deposits distributed along and within the SBC channel (mine wastes and sediment with adsorbed metals)
- Upstream sources (not in the BPSOU)

Pathways:

- Fluvial movements during seasonal high flow
- Groundwater inflow
- Groundwater/Surface water interaction with contaminated sediment.

The main elements of the CSM for wet weather flow include the following:

Sources:

- Mine waste (waste rock and tailings and other contaminated areas) via runoff and groundwater input
- Upstream sources (not in the BPSOU)

Pathways:

- Surface water runoff to stormwater to SBC
- Pipe bedding to stormwater to SBC
- Upstream sources to stormwater to SBC

Decisions and Previous Remedial Actions

Remedial Action Objectives for Surface Water

Remedial actions implemented for the purpose of meeting remedial goals (RGs) are intended to result in attainment of remedial action objectives (RAOs). The RAOs for contaminated surface water specified in the 2006 Record of Decision (ROD) (U.S. Environmental Protection Agency) [EPA] and Montana Department of Environmental Quality [MDEQ] 2006) for the BPSOU were as follows:

- Prevent ingestion or direct contact with contaminated surface water that would result in an unacceptable risk to human health.
- Return surface water to a quality that supports its beneficial uses.
- Prevent source areas from releasing contaminants to surface water that would cause the receiving water to violate surface water ARARs and RGs for the OU and prevent degradation of downstream surface water sources, including during storm [wet weather] events.
- Ensure that point source discharges from any water treatment facility (e.g., water treatment plant, wetland, etc.) meet ARARs.
- Prevent further degradation of surface water.

- Meet the more restrictive of chronic aquatic life or human health standards for surface water identified in Circular DEQ-7 ([ROD] Table 8-2) through the application of B-1 class standards. [Applies to base and normal high flow conditions. Acute aquatic life standards apply to wet weather conditions.]

Performance Standards

The ROD defines performance standards for surface water as narrative and numeric water quality standards. These standards apply to point sources and as in-stream standards. The performance standards were promulgated under DEQ-7 (MDEQ 2006). The required standards for base flow and normal flow are chronic aquatic life and human health standards and for stormwater runoff or "wet weather conditions" are the acute aquatic life standards. The BPSOU ROD does not identify human health standards for wet weather conditions.

In-stream sediments are not specifically addressed in the RGs. However, the ROD requires the removal of contaminated in-stream sediments, and one goal of the previous response actions and future remedial actions for the BPSOU is to eliminate or minimize sources of contamination to SBC sediment (i.e., surface water transport of contaminated soils or waste) such that excessively contaminated sediments are not present.

Previous Remedial Actions

Numerous remedial actions were completed both before, and following, the issuance of the ROD. These actions were implemented to address water quality issues during base, normal high, and wet weather flow conditions.

Data Analysis

Some of the of key remedial activities, including source area removal and capping, capture and treatment of groundwater, and the construction of various best management practices (BMPs) to control stormwater runoff within the BPSOU boundary, were performed and mostly completed by 2011. Although results outlined in the surface water characterization report (SWCR) (EPA and MDEQ 2017) indicate surface water quality has improved, exceedances of ARARs still occur regularly for multiple contaminants of concern (COCs) during wet weather conditions and irregularly during base flow and normal high flow conditions. Data from main stem locations in Blacktail Creek and SBC both upstream and within the BPSOU have been assessed as part of this TI.

Water Quality Results in the BPSOU (2008–2013)

Surface water within the BPSOU is categorized into three flow regimes, and the analyses in this TI report have been structured as such:

- Base flow
- Normal high low
- Wet weather flow

Base Flow

During base flow conditions, copper results show a considerable difference between dissolved and total recoverable concentrations at most stations, indicating that colloids or fine sediments containing copper are suspended in the surface water during base flow and changes in water quality are occurring over the operable unit (OU). From 2008 through 2010 (when construction to remediate the Butte Reduction Works [BRW] seep was completed), total recoverable copper exceeded the chronic performance standard on a regular basis, whereas, from 2011 through 2013, far fewer exceedances occurred except at station SS-07 downstream of the Metro Sewage Treatment Plant (STP). All sample results for total recoverable arsenic, silver, and zinc and dissolved aluminum from 2008 through 2013 were below the relevant performance standard. Surface water quality performance standards are being met during base flow conditions, with the exception of copper at SS-07.

Normal High Flow

During normal high flow, copper concentrations were lower in the 2011 through 2013 period compared to 2008 through 2010, specifically following the BRW seep remediation and bank sediment removal in the Blacktail-SBC confluence to Montana Street area by early-2011, but still had a number exceedances during both periods. From 2008 through 2009, total recoverable copper exceeded the chronic performance standard in over 80 percent of sample results at stations SS-05A, SS-06A, and SS-07. Since 2011, total recoverable copper only exceeded the chronic performance standard in 10 to 15 percent of sample results at SS-05A and SS-06A, with the rate at SS-07 decreasing to 35 percent. The largest source of total recoverable copper loading during high normal flow conditions includes discharge of effluent from the Metro STP, sediment in the reaches upstream of SS-06G, and upstream sources. The reach from SS-05 to SS-05A (slag canyon) was estimated to be 27 percent of the overall reach load, making it a large loading source over a fairly short reach.

Arsenic and iron concentrations during normal high flow were similar at each station and showed a general relationship to discharge—higher discharge equates to higher arsenic and iron concentrations. Exceedances at the stations ranged from 13 to 18 percent for arsenic and 8 to 18 percent for iron. In general, concentrations of arsenic and iron were greater during spring runoff. Total recoverable lead concentrations were typically below the chronic performance standard, with the exception of two to three exceedances at each of the following stations SS-07, SS-05A, SS-05, and SS-04. These results were notably greater than the dissolved fraction and adjacent sample results, and are related to suspended sediment. No or few exceedances of performance standards for aluminum, cadmium, zinc, and silver were observed.

Wet Weather Flow

During wet weather flow conditions, total recoverable copper concentrations always exceeded the acute performance standard at stations SS-07 and SS-06G and almost always exceeded the acute standard from stations SS-06A to SS-01 for the period of 2008 through 2013. The maximum copper concentrations were lower overall later in that period. Total recoverable arsenic exceeded the acute performance standard only once—at SS-04. All other total recoverable arsenic concentrations were within the acute standard. Total recoverable cadmium had a low number of exceedances at all main stem stations. Total recoverable lead had a moderate number of exceedances from 2008 through 2013; however, there were large variations in lead

concentrations at SS-04 that are considered indicative of variability in the flushing of suspended solids during wet weather events. Total recoverable zinc exceeded the acute performance standard in approximately 50 percent of samples analyzed at stations SS-05 through SS-07. Similar to lead, zinc exhibited large fluctuations in concentrations between the minimum reported values and the maximum. For example, at station SS-04, the total recoverable zinc concentrations ranged from 8.5 to 10,900 micrograms per liter (µg/L). These variations are likely due to resuspension of sediments, either from along the stream bank, or from point sources along the creek.

Upper SBC and Buffalo Gulch are clearly the largest sources of loading for all COCs during wet weather conditions. Upstream sources, measured at SS-01, consistently contribute additional load for all COCs. The COCs with significant exceedance rates—copper, cadmium, lead, silver and zinc—were carried forward to the analytical section of the TI for wet weather conditions.

Upstream Sources and Water Quality

There are multiple main stem stations on Blacktail and SBC. Station SS-01, located on Blacktail Creek at Harrison Avenue, is the farthest upstream station and considered an upstream boundary condition; it represents water quality entering the OU.

During base flow conditions, from 2008 through 2013, all copper and lead concentrations at SS-01 were low and well below the chronic performance standard other than one potential outlier value in 2008. There was only a small separation between total recoverable and dissolved values, indicating that suspended sediments are comparatively low. Aluminum, arsenic, cadmium, silver, and zinc had no base flow exceedances at this station during the same period.

During normal high flow conditions, loading of arsenic, copper, and iron from sources upstream of SS-01 is evident. From 2008 through 2013, the number of arsenic exceedances at SS-01 is similar to the number of exceedances at the downstream stations. Approximately 43 percent of arsenic loading occurs from sources upstream of sampling station SS-01; thus, the main source of arsenic (as well as iron) appears to be located upstream of the site. The number of copper exceedances at SS-01 was comparatively fewer than the stations downstream for the period from 2011 through 2013, indicating that, while upstream sources of copper contribute to loading, other contributions of copper loading are present within the BPSOU.

During wet weather conditions, copper has approximately a 90 percent exceedance rate at SS-01, again indicating an upstream source of copper exists. Notable, although fewer, exceedances of cadmium (6 percent), lead (11 percent), and zinc (24 percent) also occurred at SS-01 during wet weather flows from 2008 through 2013. While sources upstream of SS-01 consistently contribute additional load, they are a much smaller magnitude than those within the OU.

Development of Stochastic Model for Prediction of Stormwater Quality

The primary focus of the Surface Water Management Program is to systematically identify areas of stormwater contamination and implement appropriate BMPs to reduce the transport of contaminants to SBC. Although these improvements have reduced contaminant loading, acute aquatic life performance standards continue to be frequently exceeded in SBC during wet

weather events, often by orders of magnitude. Several remaining contaminant sources are known, including the buried stormwater conveyance system and areas of exposed mine waste. A reassessment of stormwater within the BPSOU commenced in 2014 to determine, with increased certainty, whether total recoverable performance standards for the identified mining-related COCs could potentially be met during wet weather events. This included further updates and revisions to improve a stochastic model previously created by including a much larger data set as well as additional stormwater improvements undertaken within the BPSOU and further refinements to the model. The model was then run to simulate the effectiveness of a wide range and combinations of potential stormwater technology elements (TEs). The TEs are a variety of stormwater BMPs that could realistically be implemented in the BPSOU. Total recoverable copper was identified as the metal most likely to exceed performance standards; therefore, modeling was performed only for total recoverable copper. Correlations were then developed between copper and other COCs, which allowed the model results to be applied to the other COCs, thereby determining what potential impacts the TEs would also have on improving water quality within the BPSOU.

Overview of Stochastic Model Construction

Due to the uncertainty that is inherent in stormwater data, concentrations of total recoverable copper in SBC were stochastically modeled with a mixing model that used @Risk® for Microsoft Excel using Monte Carlo simulations. The model used probability distribution functions (PDFs) of copper concentrations from the various surface water inputs to SBC (Blacktail Creek, upper SBC, storm sewer outfalls) to represent the copper loading from those sources. Those functions were sampled to determine the copper concentration model inputs for the simulation.

Hydraulic Inputs to the Model

A stormwater model for the Butte Hill drainage basins was developed using HydroCAD® software in 2009, with the methodology and results detailed in the *Draft Butte Stormwater Modeling Report, Butte Priority Soils Operable Unit* (CDM 2009c). As part of this TI analysis, this model was further updated with current information and as-builts to correct areas that were found to be in error from the original version. For this TI evaluation, the Soil Conservation Service Type I, 5-year, 24-hour design storm was used in the hydrologic model to calculate runoff flow rates.

One of the greatest uncertainties in this model is the distribution of rain patterns in the Blacktail Creek watershed and Butte Hill. Depending on actual storm patterns, the timing of peaks from Blacktail Creek and those derived from Butte Hill could differ by hours. To bracket the range of the multiple scenarios possible, the model was run using both a high (wet weather flow) and low (base flow) flow rate within Blacktail Creek under steady-flow conditions.

Water Quality Input to the Model

Data presented in the SWCR (EPA 2016) indicate copper is the most problematic COC for stormwater within the BPSOU; therefore, the model has been focused on total recoverable copper. Moderate to strong correlations exist between the relevant COCs and copper, with R^2 values ranging from 0.65 to 0.87; therefore, it was assumed that any TEs that address total recoverable copper will also address the other total recoverable mining-related COCs. The total recoverable copper concentrations for each subbasin were input as stochastic variables in the form of PDFs. In addition, statistical analyses were conducted to identify correlations between the

various subbasins. Data sets for both a local storm event and regional storm event were analyzed, and a different PDF for Blacktail Creek chemistry was used for the two different flow regimes.

Several key assumptions were made regarding water quality data. The first assumption was that stormwater concentrations from outfalls are constant over the duration of the storm during each Monte Carlo iteration and are conservative because the mechanical samplers at the outfalls (i.e., the input data to the stochastic model) are set to collect the first flush of each storm, which generally is stormwater with the highest metals concentrations. The model assumes that no degradation, settling, or resuspension occurs and that instantaneous and complete mixing occurs at the point of discharge.

Comparison to Acute Water Quality Performance Standards and Background Concentrations in Blacktail Creek

For the stormwater TI evaluation, modeled concentrations at SS-06G were compared to the acute DEQ-7 standards and existing water quality conditions at sampling station SS-06G. The acute DEQ-7 standard for the five contaminants assessed as part of this TI (copper, zinc, lead, silver, and cadmium) for aquatic life are hardness-dependent. For comparison against the modeling results, a hardness-based standard was calculated for each iteration of the model at SS-06G, and the modeled concentration at SS-06G was compared to it. Hardness was calculated by creating a stochastic variable (in the form of a PDF) using hardness values from the wet weather data. The PDF value was then inserted into individual hardness-based formulas identified in the DEQ-7 standards, with exceedance rates calculated for water quality at SS-06G.

Model predictions show higher concentrations of copper occur in surface waters during a local storm event. A lower flow rate in Blacktail Creek during a local storm event results in less dilution and higher metals concentrations. Conversely, higher flow in Blacktail Creek results in greater dilution. Concentrations of other mining-related COCs were calculated using the correlation equations and showed a similar result during both local and regional storm events.

Evaluation of Remedial Actions and Restoration Potential

An evaluation of TEs for reduction of in-stream COC concentrations was undertaken for each flow regime to determine whether current water quality performance standards within the BPSOU could be achieved. This evaluation was divided into two parts: (1) base flow and normal high flow and (2) wet weather flow.

Evaluation of Base Flow and Normal High Flow Remedial Technologies

The evaluated TEs that address exceedances of the chronic aquatic life performance standards during base flow and normal high flow conditions included:

- The removal of bed, bank, and adjacent floodplain tailings and sediments for the entire reach of Blacktail and SBC within the OU
- Meeting future effluent performance standards at the Metro STP

As one exceedance per 3 years is allowable per DEQ-7, the analysis indicates that meeting the DEQ-7 chronic aquatic life standard for copper upstream of the Metro STP discharge point is

possible but not certain. Predicted results indicated zero to one exceedance per 3 years. Downstream of the STP discharge (SS-07) for the sediment removal alone, assuming an effectiveness of 80 percent reduction in total recoverable concentrations, a number of exceedances over a 3-year period were predicted for copper, arsenic, iron, and lead. Additionally, the sensitivity analysis showed that an effectiveness as low as 50 percent would still result in an acceptable exceedance rate.

When sediment removal is combined with meeting the STP permit's effluent requirements, predicted copper concentrations will exceed the chronic aquatic performance standard one time over a 3-year period. This is allowable and is predicted to meet performance standards; however, considering the uncertainty involved in the calculations, the number of exceedances could be greater or less than one. Based on the results of this analysis, at this time, it is concluded that copper could meet chronic water quality performance standards during base flow and normal high flow. It is entirely possible that actual results following implementation of these TEs may not match the predictions and the number of exceedances is significantly greater than the allowable amount. If after implementation of technically practicable remedial measures addressing base and normal high flow conditions, the total recoverable copper standard and the total recoverable lead standard for chronic conditions are not met, a waiver of the state standards is appropriate and will be applied.

No actions conducted within the BPSOU will change upstream conditions, and therefore it does not appear possible to meet the human health ARAR for arsenic and the chronic aquatic life ARAR for iron. For arsenic and iron, upstream conditions strongly influenced exceedances at the site. The upstream station is located in OU13, West Side Soils operable unit. Site characterization of OU13 has not been conducted, and there has not been any analysis of the sources of arsenic and iron or their potential for control.

Total recoverable lead exceedances were minimal in the 2011 through 2013 data, and application of the sediment removal TE is predicted to reduce these exceedances to less than one per 3 years, which meets DEQ-7 requirements.

Evaluation of Stormwater Remedial Technologies

Multiple TEs to reduce COC concentrations during wet weather events were evaluated. These included source controls, detention basins, bioretention basins, and several other stormwater BMPs. Based on the results of the various analyses, it is clear that copper and zinc are not likely to meet acute water quality performance standards, regardless of what measures are implemented to control the COCs. However, cadmium, lead, and silver could meet acute water quality performance standards, depending on what TEs are implemented and what the ultimate removal efficiencies of those TEs are, but there is uncertainty associated with this prediction. Additionally, the inclusion of an upstream allowance parameter does not significantly affect the results. The results provide the basis for the choice of the alternative remedial technology.

Alternative Remedial Strategy

The alternative remedial strategy includes additions and/or modifications to the selected remedy in the ROD, which will also be outlined in a proposed plan for public comment. In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal

Regulations [CFR] Part 300), the performance of the alternative remedial strategy described for base and normal high flow and for wet weather flow was evaluated using the nine criteria (Section 300.430(e)(9)(iii) of the NCP as a basis for comparison. This evaluation determines if the alternative strategy: (a) meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs (unless a waiver is justified), (b) provides the "best balance" with respect to the five balancing criteria of 40 CFR Section 300.400(e)(iii)(C)-(G), and (c) takes into consideration the acceptance of the state and the community.

Base Flow and Normal High Flow

The selected remedy in the ROD for base flow and normal high flow events consists of three primary actions: contaminated groundwater control; excavation of contaminated sediment, stream banks, and adjacent floodplain wastes removal; and, if needed, flow augmentation. To date, substantial groundwater control has been implemented. The effectiveness of contaminated sediment, stream banks, and adjacent floodplain waste removal was estimated to be sufficient or within the range of uncertainty, along with continued and improved contaminated groundwater control, to achieve water quality performance standards for most COCs under base and normal high flow conditions. This remedial element is retained as part of the remedy. For COCs where water quality performance standards are not likely to be met, the alternative remedial strategy for base flow and normal high flow conditions would modify the selected remedy by incorporating institutional controls and an upstream accounting methodology and provide for contingent waivers of the copper and lead performance standards as follows:

- Contingent ARAR waivers – If after implementation of bed, bank, and nearby floodplain-contaminated tailings and sediment removal, and further groundwater control, State of Montana chronic standards for total recoverable copper and lead are not met, waiver of these performance standards to the current federal ambient water quality criteria (AWQC) Biotic Ligand Model (BLM) criterion for copper and the federal AWQC for lead identified in the 2006 BPSOU ROD is warranted.

Institutional controls may need to be developed to address potential human consumption of surface water exceeding the human health performance standard for arsenic. Also, an upstream accounting methodology recognizes that water quality upstream of the BPSOU does not consistently meet aquatic performance standards during normal high flow, resulting in exceedances as the water flows through the BPSOU.

All other ROD requirements for base flow and high flow conditions are retained, including but not limited to contingency measures if the remedial actions are not fully protective and compliant. Surface water monitoring is also retained and important for remedial implementation.

Wet Weather Flow

The selected remedy in the ROD for wet weather flow included the Surface Water Management Program. This is an iterative process of implementation of stormwater BMPs and diagnostic monitoring to address COC sources during runoff events from the BPSOU. In this TI report, various TEs, including several combined TEs, were evaluated to predict improvements to stormwater quality. Based on the analysis, the construction and operation of stormwater basins

at both Buffalo Gulch and upper SBC is likely to be the most effective and practicable approach to reduce in-stream COC concentrations during wet weather events.

While stormwater basins will greatly improve water quality in SBC, stochastic modeling indicates total recoverable copper and zinc are unlikely to meet acute water quality performance standards during most wet weather flow conditions. Therefore, the alternative remedial strategy for wet weather flow includes implementation of further practicable BMPs (to be identified in the Consent Decree) and incorporates an up-front waiver of the DEQ-7 acute water quality standards for total recoverable copper and zinc and contingent waivers for other metals criteria as follows:

- ARAR waivers – Waiver of the State of Montana acute aquatic standards for total recoverable copper and zinc is warranted at the site. The waived performance standards will be replaced by the 1996 federal AWQC (EPA1996) freshwater criterion maximum concentration (CMC) for copper and zinc within the BPSOU (hardness-based dissolved standard). The waived-to performance standards for copper and zinc use the same DEQ-7 numerical standards except that a dissolved conversion factor is applied to the total recoverable numeric standards, the analysis is for dissolved metals, and there is no minimum or maximum value for hardness. The 2006 ROD ARARs identified the federal AWQC as applicable and protective under the Clean Water Act, and they are therefore considered suitable and protective replacement performance standards. If after implementation of technically practicable remedial measures to address wet weather flow, the dissolved CMC standards for copper and zinc are not met, further waivers to the current federal AWQC may be needed. For copper, this would include a waiver to the criterion known as the BLM, modified for use in acute conditions. For zinc, this would include a waiver to the applicable federal criterion at the time of compliance determination. Additionally, after implementation of technically practicable remedial measures to address wet weather flow and monitoring, if achievement of cadmium, lead, and silver acute aquatic performance standards for total recoverable are not met, waiver of the performance standards and replacement of the standards with the federal AWQC standards is appropriate.

- Upstream allowance – This component recognizes that water quality upstream of the BPSOU does not consistently meet aquatic performance standards during wet weather events, resulting in exceedances as the water flows through the BPSOU. The upstream allowance is a method to account for upstream influences on water quality within the BPSOU.

All other ROD requirements for wet weather flow conditions are retained, with the exception of the construction of a separate, stormwater treatment plant, which is not viewed as practicable in the BPSOU setting. Surface water monitoring is also retained and is important for remedial implementation.

Conclusions

The remedial actions identified in the alternative remedial strategy are expected to reduce the scale of exceedances of the acute aquatic life performance standard for copper from the current orders of magnitude to within a few parts per billion of the standard. The measures are also

expected to reduce zinc exceedances. However, neither performance standard will be met, and there is uncertainty regarding compliance with cadmium, lead, and silver acute standards. Additionally, the actions in the alternative remedial strategy are anticipated to result in meeting chronic aquatic life performance standards in surface water at the site with some uncertainty for copper and lead standards. The alternative remedial strategy is consistent with the selected remedy at the site and is expected to meet RAOs for surface water set forth in the 2006 ROD for the BPSOU.

Waivers of acute aquatic life performance standards for copper and zinc and the substitution of protective copper and zinc standards from the federal AWQC are included in the alternative remedial strategy and intended to be protective of aquatic life following implementation of the alternative remedial strategy. Should the implementation of the alternative remedial strategy not meet in-stream performance standards after monitoring, and the substitution of protective federal AWQC criteria, provisions for further waivers of acute cadmium, lead, and silver performance standards and waived-to acute copper and lead performance standards are also warranted. If waivers are adopted as recommended by this TI evaluation, this is a modification of the ROD remedial goals for surface water and needs to be formalized in a decision document.

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Addendum

Addendum No.1 Evaluation of TI Data Set for Currency

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List of Acronyms and Abbreviations

µg/L	microgram per liter
ACMC	Anaconda Copper Mining Company
ARAR	applicable or relevant and appropriate requirement
AR	Atlantic Richfield Company
AWQC	ambient water quality criteria
BG	Buffalo Gulch
BLM	Biotic Ligand Model
BMP	best management practice
BPSOU	Butte Priority Soils Operable Unit
BRW	Butte Reduction Works
BSB	Butte-Silver Bow
BTL	Butte Treatment Lagoons
$CaCO_3$	calcium carbonate
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMC	criterion maximum concentration
COC	contaminant of concern
CSM	conceptual site model
DTEC	DTEC Corporation
EPA	U.S. Environmental Protection
ERA	expedited response action
FS	feasibility study
gpm	gallon per minute
HCC	hydraulic control channel
HDD	hydrodynamic device
IC	institutional control
IMP	interim monitoring plan
ISCO	Teledyne Isco
LAO	Lower Area One
lb/day	pounds per day
MBMG	Montana Bureau of Mines and Geology
MDEQ	Montana Department of Environmental Quality
mg/kg	milligram per kilogram
mg/L	milligram per liter
MPDES	Montana Pollutant Discharge Elimination System
MSD	Metro Storm Drain
N/A	not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NRC	National Research Council
NRCS	Natural Resources Conservation Service
OU	operable unit
PDF	probability distribution function
Pioneer	Pioneer Technical Services
PRP	potentially responsible party

PVC	polyvinyl chloride
RA	remedial action
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RG	remedial goal
RI	remedial investigation
ROD	Record of Decision
SBC	Silver Bow Creek
SCADA	supervisory control and data acquisition
SCS	Soil Conservation Service
SSTOU	Streamside Tailings Operable Unit
STP	sewage treatment plant
SWCR	surface water characterization report
TCRA	time-critical removal action
TE	technology element
TI	technical impracticability
TSS	total suspended solids
USGS	U.S. Geological Survey

Section 1
Introduction

This report presents an evaluation of the technical impracticability (TI) of attaining certain aquatic water quality performance standards within the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek /Butte Area National Priorities List (NPL) Site in Butte, Montana (hereinafter "BPSOU") (see Figure 1-1 for site location). This TI evaluation was prepared by the U.S. Environmental Protection Agency (EPA) as part of its efforts to evaluate if a waiver of certain applicable or relevant and appropriate requirements (ARARs) for in-stream ambient water quality, contained in the EPA and Montana Department of Environmental Quality (MDEQ) 2006 BPSOU Record of Decision (ROD), is warranted. This evaluation examines the collection of surface water data, implementation of certain stormwater control measures, detailed analysis of practicable future measures, and relevant site experience and field knowledge at the BPSOU. This evaluation has been prepared in consultation with MDEQ.

State of Montana aquatic life standards for various contaminants of concern (COCs), except aluminum, are measured on a total recoverable basis in surface water under state water quality regulations. These standards were identified as ARARs in the BPSOU ROD (EPA and MDEQ 2006) for in-stream surface water at the site. Under the Comprehensive Environmental Response, Compensation, and Liability Act as amended (CERCLA) Section 121 (d)(4)(c) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR (Code of Federal Regulations) Section 300.430 (f)(1)(ii)(c)(3), EPA may invoke a waiver of specific ARARs if it determines, in consultation with MDEQ, that such standards are technically impracticable to attain from an engineering perspective.

This TI evaluation was prepared to provide EPA decision makers a basis to determine whether to invoke a waiver of certain aquatic water quality performance standards. Specifically, waivers are sought for acute aquatic life criteria for copper and zinc specified in the ROD. Contingency waivers are also sought if needed following implementation of the alternative remedial strategy and a period of monitoring for acute performance standards for cadmium, copper, lead, and silver and chronic performance standards for copper and lead. The ROD for BPSOU specified a number of remedial actions to be undertaken to meet remedial action objectives (RAOs) and attain surface water ARARs. Many of these actions have been taken, including, for wet weather, cycles of wet weather controls and pre-ROD stormwater controls under EPA's removal authority. This document presents an evaluation of the effectiveness of the implementation of the selected remedies and other technically practicable, enhanced remedial actions aimed specifically at wet weather control in attaining surface water ARARs. This TI evaluation is based on more detail than was previously available following the completion of the BPSOU feasibility study (FS), proposed plan, and ROD due to the experience and data obtained in implementing remedial actions, including certain wet weather control measures.

1.1 Problem Statement

The BPSOU site contains numerous sources of historic mining wastes, including waste rock, mill waste, tailings, contaminated soil, and severe groundwater contamination in the alluvial aquifer beneath and adjacent to Silver Bow Creek (SBC). These sources and media have contaminated surface water within the BPSOU and off-site, downstream of the BPSOU boundary. The general transport routes that deliver metals to surface water include stormwater and snowmelt runoff, sediment transport to and within the creek, and contaminated groundwater inflow.

Before completion of the ROD, extensive response actions were implemented, including source area capping, stormwater routing and retention improvements, the installation of two groundwater capture systems, and a base flow diversion system for Missoula Gulch. Following the implementation of these improvements, monitoring activities indicated a significant improvement in surface water quality, allowing for further identification of additional/remaining sources and pathways that affect water quality in SBC.

Three perennial streams are present in BPSOU: SBC, Blacktail Creek, and Grove Gulch. A remedial action objective in the ROD is to return surface water to a quality that supports its beneficial uses, which includes growth and propagation of salmonid fishes and associated aquatic life. This objective is accomplished by attaining surface water performance standards or criteria for site COCs that are protective of these biota. Additional RAOs are presented in Section 3.1.

Surface water quality at the BPSOU is impacted by metals in a variety of ways, depending on flow regime. During wet weather events, contaminated sediment becomes entrained in surface runoff as it flows from the uplands in the BPSOU, and contaminated runoff enters SBC, Blacktail Creek, and Grove Gulch Creek. This causes significant to severe exceedances of acute aquatic water quality performance standards; total recoverable metals concentrations tend to be much higher than dissolved metals concentrations during runoff events. Historically, during base flow conditions, groundwater was a contributor of flow to SBC. However, the majority of contaminated groundwater is presently captured and treated, thereby limiting the amount of contaminated groundwater impacting SBC. During seasonal normal high flow conditions in spring and fall, contaminated sediment and streamside mining waste become entrained and contribute to exceedances of chronic aquatic water quality performance standards. Section 5 of this report presents the conceptual site model (CSM) for surface water contamination in detail.

In general, the ROD identified the selected remedy for surface water as a combination of a comprehensive best management practices (BMP) program throughout the BPSOU; removal actions along the stream banks, streambed, and adjacent floodplain; and further groundwater capture and treatment. Each action is expected to reduce metals loading to SBC during the three flow regimes.

Previous documents, including FSs, the proposed plan, and the ROD, described these actions in broader terms. This TI evaluation further develops and enhances some of these remedy elements and then evaluates the ability of implementing these actions and other practicable actions and their effectiveness at attaining surface water ARARs.

1.2 Scope

This report is intended to provide EPA and MDEQ with information to determine whether it is technically impracticable for remedial actions to attain certain aquatic performance standards (identified as ARARs in the ROD) in accordance with CERCLA and its implementing regulations. The report provides the following information:

- A summary of the surface water data collected before and after the completion of the 2006 ROD
- A review of the CSM for surface water contamination during base and normal high flow and wet weather flows in Blacktail Creek, Grove Gulch Creek, and SBC based on the available data and current conditions
- A review of the performance standards, previous response activities, and the selected remedy pertaining to surface water remediation
- A stochastic model to evaluate and compare design alternatives and evaluate the potential of the remedial strategy to achieve certain ARARs (acute aquatic standards)
- An evaluation of BMPs and engineering control alternatives that are part of the selected remedy, including additional actions beyond those considered in the ROD and ROD implementation planning (i.e., the alternative remedial strategy)

1.3 Terminology

The following terms used in this report, some of which may be a potential source of confusion due to differences between usage within the BPSOU site record and the usage in EPA guidance, are defined below.

- Base flow – Base flow is defined as times when groundwater inflow comprises the greatest percentage of flow within surface water. Both surface water and groundwater vary seasonally, but base flow generally occurs in late summer and winter when surface water conditions are fairly stable (i.e., not rising or falling and stormwater or snowmelt runoff is not occurring). The purpose of analyzing base flow surface water conditions is to evaluate the effects of groundwater inflow on surface water. Groundwater input is best observed at lower flows. For compliance, metals concentrations at base flow are compared to chronic aquatic life and human health performance standards (see Section 3.2).
- Normal high flow – Normal high flow is defined as normal flow that increases above base flow when the regional winter mountain snowpack melts and there is no local wet weather event. In general, the highest concentrations of contaminants are associated with normal high flows and wet weather event flows and are a focus of compliance analysis in this report. For compliance, metals concentrations at normal high flow are compared to chronic aquatic life and human health performance standards (see Section 3.2).

While it is easy to envision base flow as conditions occurring at low flow with clear water and relatively slow velocities and the stream occupying only a portion of the channel and high flow as turbid water and higher velocities occupying all of the channel, drawing a line separating the two

categories is less intuitive. For BPSOU, abundant surface water data are available that represent all flow conditions. During sampling, field technicians often note that conditions are base flow or normal high flow based on the overall impression of conditions in the field. These descriptions were compared to discharge at the time of the observations and the antecedent and precedent hydrologic conditions, specifically, the daily average discharge obtained from the U.S. Geological Survey (USGS) gaging stations within BPSOU. It was determined that the 50th percentile of the daily discharge for a rolling 1-year period was useful at separating base flow observations from normal high flow observations. The rolling 50th percentile discharge for 2008 through 2013 is shown on Figure 1-2. Discharge below the line represents base flow conditions, and discharge above the line represents normal high flow and wet weather event flow.

- Wet weather flow – For the purposes of this report and consistency with the ROD, the term wet weather flow is defined as short duration periods when runoff is occurring from Butte Hill as measured at storm drain outfalls and/or when samples are collected at any of the wet weather discharge points. In general, wet weather flow conditions are highly variable and typically occur during rainfall and snowmelt events from spring through late summer and early fall. For compliance purposes, metals concentrations in samples collected during wet weather flow conditions are compared to acute aquatic life performance standards (see Section 3.2).

- Restoration – At the BPSOU, the term restoration generally refers to actions intended to return the site to natural conditions prior to the commencement of mining activities and is associated with the State of Montana's Natural Resource Damage Program actions at the BPSOU. Within the *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration* (TI Guidance) (EPA 1993), restoration is used to refer to actions intended to attain surface water and groundwater ARARs. This report attempts to be consistent with the TI Guidance and uses the term restoration when referring to remedial actions intended to meet ARARs. Within this document, restoration does not refer to actions intended to restore the site to pre-mining conditions or pre-natural resource damage.

1.4 Report Organization

This report is organized in general accordance with the TI Guidance (EPA 1993) and *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents* (EPA 1999). Although the TI Guidance is directed at groundwater restoration, the constructs are useful for evaluations of surface water TI waivers.

This report is divided in to the following sections:

- Section 1 provides the problem statement, purpose, and scope of the TI evaluation report.

- Section 2 briefly describes the current understanding of the BPSOU, including site description, historical activities carried out at the BPSOU, and sources of contamination to surface water.

- Section 3 summarizes the RAOs, performance standards, points of compliance, and previous decisions, including the selected remedy for surface water, and lists the previous response actions affecting surface water quality.

- Section 4 presents a brief summary of normal flow (base flow and normal high flow) and wet weather water quality data collected at the site along with an interpretation of the sources of metals loading to surface water.
- Section 5 presents a CSM for three flow regimes: wet weather flow, base flow, and normal high flow.
- Section 6 presents a description of the stochastic water quality model used to evaluate wet weather conditions for the TI evaluation. The outputs of the model are used in the effectiveness evaluation.
- Section 7 identifies and evaluates the technology elements (TEs) to achieve compliance with surface water ARARs. The TEs are conceptual designs of the selected remedy and other practicable, enhanced remedial components.
- Section 8 summarizes the comprehensive surface water alternative remedial strategy that is technically practicable and protective of human health and the environment. This section also includes a map showing the areal extent of where surface water TI waivers are sought.
- Section 9 provides a summary and conclusions of this TI evaluation.
- Section 10 presents the references cited in this report.

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Section 2

Site Description

The Silver Bow Creek/Butte Area NPL Site, which includes the BPSOU, represents one of four contiguous Superfund sites in the upper Clark Fork River basin that extends 140 miles from the headwaters of SBC north of Butte to the Milltown Reservoir near Missoula, Montana (see Figure 1-1). The BPSOU lies immediately west of the Continental Divide in southwestern Montana at the easternmost extent of the upper Clark Fork River drainage. The Silver Bow Creek/Butte Area NPL Site encompasses approximately 85 square miles, including the entire length of SBC and associated land contamination from Butte westward and approximately 25 miles to the Warm Springs Ponds near Anaconda. The site incorporates several square miles of land area within and near the City of Butte, Montana. The BPSOU encompasses the Town of Walkerville, the part of Butte north of SBC and west of the Berkeley Pit, and a section of land that extends south from SBC to Timber Butte (see Figure 2-1). EPA is the lead agency and MDEQ the support agency for the BPSOU.

The BPSOU covers an area of approximately 5 square miles and is located a few miles west of the Continental Divide at an elevation range of approximately 5,400 to 6,400 feet above mean sea level. The area where BPSOU is located encompasses the northwestern portion of the Summit Valley and is characterized by gently sloping terrain, generally sloping toward the north in the southern portion of the valley and toward the south and west in the northern portion of the valley. Mountains bound the valley on the east, south, and north, with highest elevations reaching over 10,000 feet in the Highland Mountains south of Butte. The two primary streams in the valley are Blacktail Creek, which begins in the Highland Mountains to the south, and SBC, which begins where Blacktail Creek and the upper Silver Bow Creek (upper SBC) converge. SBC flows west along the base of the Butte Hill and, before mining, originated in the mountains northeast of the BPSOU. As a result of mining activities, the original route of SBC was rerouted, with the original channel and floodplain replaced by the Berkeley Pit and the Yankee Doodle Tailings Pond. Upper SBC was reconstructed by realigning and filling the area of the former channel, a low-lying swampy area with numerous mine waste impoundments. Upper SBC is generally dry, except during storm runoff or snowmelt events. The primary source of flow in SBC is inflow from Blacktail Creek. Figure 2-2 shows the area of interest relating to the BPSOU surface water TI evaluation.

Groundwater flow from the drainage area converges in the west-central portion of the BPSOU, within an area known as the Lower Area One (LAO). Groundwater exits the west side of the BPSOU (and LAO) in a narrow region of the floodplain alluvium associated with SBC. The alluvial deposits within this narrow region are less than 20 feet thick. The reduction in lateral extent and thickness of the alluvium near the west end of the BPSOU greatly decreases the cross-sectional flow area of the alluvial system, resulting in a 'neck' from which only a small portion of the alluvial groundwater can exit the basin. As a result, alluvial groundwater within the Summit Valley is forced to discharge to Blacktail Creek, the BPSOU subdrain, the south side of SBC, and various groundwater control ponds and channels in LAO constructed as part of the LAO expedited

response action (ERA). The hydrogeological setting within LAO and the hydrologic modifications made as part of the LAO ERA have made it possible to control, collect, and treat the majority of alluvial groundwater within the BPSOU. Additional information on previous actions is presented in the BPSOU ROD.

2.1 Site History

Throughout the years, various historic mining activities occurred within the BPSOU; these are summarized in Table 2-1 below.

Table 2-1 Site History

Timeline	Description
1864	First placer gold claims in Butte area staked and worked.
1870s	Dozens of silver and copper claims located. Successful treatment processes developed, prompting the construction of mills and smelters capable of refining arsenic-laden copper ores.
1881	Marcus Daly purchased mining claims. Anaconda Minerals Company formed. Over 300 operating copper mines, at least 10 silver mines, fire smelters, and 4,000 posted claims present. The company later became the Anaconda Copper Mining Company (ACMC).
1883	Daly developed own smelting facility 25 miles from Butte, establishing the Town of Anaconda.
Early 1890s	ACMC constructed a railroad, the Butte, Anaconda and Pacific, monopolizing the mining, transportation, and smelting of copper ore.
1910	Butte district produced over 284 million pounds of copper, making it the largest producer of copper in North America.
1910–1927	ACMC completed consolidation of all the major mines, smelters, and mills in Butte.
1955	Surface mining commenced at Berkeley Pit.
1964	Completion of weed concentrator reduces the amount of ore sent to Anaconda from 12 to 1 trainload per day.
1977	ACMC merged with Atlantic Richfield Company (AR).
1982	Open pit mining operations ceased in Berkeley Pit.
1983	Open pit mining operations ceased in Continental Pit.
1984	AR closed Anaconda Smelter.
1985	Various properties sold to Dennis Washington, principal owner of Montana Resources and Montana Resources Incorporated companies.

The response actions undertaken as part of the cleanup work for the BPSOU have been documented in Table 2-2. Further detail is provided in Section 3 of this report.

Table 2-2 Remedial Activities

Timeline	Description
September 1983	EPA designated the original SBC site as a Superfund site and added the site to the NPL.
1984	Fund-led remedial investigation (RI) for SBC began.
1987	EPA modified existing Silver Bow Creek Site to include the Butte area, changing the formal name to "Silver Bow Creek/Butte Area NPL Site." BPSOU was designated as one of the operable units within the Silver Bow Creek/Butte Area NPL Site. Butte Soils Screening Study was undertaken to provide EPA with site characterization data to assist with prioritizing future RI/ FSs and removal activities.
1989	EPA divided the BPSOU into two phases—Phase I and Phase II. Phase I focused on initial investigations of high-priority human health risks and areas associated with those risks. Phase II included preparation of a full RI/FS for the entire OU.
1991	Statement of work was developed for the Phase II RI/FS.
1988–1994	Six time-critical removal actions (TCRAs) were undertaken to address immediate and significant human and environmental risks, including: Walkerville (1988) Timber Butte (1989) Butte Priority Soils (1990–1991) Colorado Smelter (1992) Anselmo/Late Acquisition/Silver Hill (1992) Walkerville II (1994)
June 1992	Consent order to conduct an RI/FS at the BPSOU was executed by EPA and signed by ARCO and other BPSOU potentially responsible parties (PRPs).
1995–1997	LAO ERA – a non-time critical removal action performed.
1997–1999	Wet weather TCRAs implemented, including the construction of catch basins and routing stormwater to Berkeley Pit.
1999–2004	Response work undertaken on various railway beds and yards.
2003–2005	Removal of channel sediments within upper SBC and the construction of the BPSOU subdrain and lining of the stormwater channel.
2006–2007	Further removal BMP activities commenced with construction of the Missoula Gulch stormwater channel and extension of the Missoula Gulch base flow pipeline to Butte Treatment Lagoons (BTL) system. September – Issuance of the ROD for the BPSOU.
2008	Metro Storm Drain (MSD) pump vault upgrade – Install redundant pump in a two-compartment system (dry and wet vaults). Butte-Silver Bow municipal stormwater system improvement plan developed and partially implemented.
2010–Present	Surface water-related construction activities carried out for both normal flow and wet weather flows, included: ▪ Curb and gutter ▪ Hydrodynamic devices ▪ Silver Bow Creek Stream Channel Remediation Project ▪ Slip lining Buffalo Gulch and Butte-Anaconda Road underground storm sewers ▪ BTL upgrades ▪ Extension of the Butte Reduction Works (BRW) groundwater capture system to the east and other measures ▪ Other BMPs

2.2 Source of Contaminants

Contaminants, including arsenic and metals, such as cadmium, copper, lead, mercury, and zinc, have been identified at the site resulting from 120 years of hard rock mining, smelting, milling, and other processing activities. Mining and ore-processing wastes represent the primary source materials, occurring in various forms, including mill tailings, waste rock, slag, heap roast and smelter fallout, and mixed combinations of each. Soils are contaminated with aerial emissions and/or from releases from the original sources. Each waste type can result in water contamination. These wastes can be categorized as:

Source Areas and Runoff – Numerous discrete areas containing mine waste are located throughout Butte Hill. Source areas were identified based on the human health action levels for solid media established in the BPSOU ROD for lead (1,200 milligrams per kilogram [mg/kg] for residential areas and 2,300 mg/kg for commercial/industrial areas) and arsenic (250 mg/kg for residential areas and 500 mg/kg for commercial/industrial). Certain other source areas with elevated copper and zinc levels were also identified. These source areas within the BPSOU have been reclaimed using several cap types, including vegetated soil cover. Despite the capping of these source areas, there are areas (i.e., outcrops and eroded areas) that may be subject to mobilization of arsenic and metals during precipitation and/or snowmelt events. The BMP program continues to assist in identifying additional areas that may need to be capped or reclaimed.

Runoff from the BPSOU flows into SBC and is known to cause occurrences of very high metals concentrations in the creek. Much of the metals load is in the form of suspended solids, which is transported via overland runoff through the stormwater system and into SBC. Once in the creek, metals can desorb from the solids under certain conditions prior to settling behind culverts, bridges, rocks, and other obstructions. Subsequent storm events can resuspend the sediment and transport the contaminated solids downstream.

Tailings, Mine Wastes, and Groundwater Contamination – Several smelters and mills with tailings ponds were historically operated in Butte, mostly along SBC. These areas have buried waste and tailings that contribute to groundwater contamination. A groundwater collection system has been installed to capture contaminated alluvial groundwater and prevent the majority of it from entering the surface water of SBC.

Section 3

Decisions and Previous Remedial Actions

This section discusses RAOs, performance standards, the selected remedy, and operations and remedial actions that have potential to affect surface water quality and quantity.

3.1 Remedial Action Objectives for Surface Water

The selected remedy described in the ROD is intended to be the comprehensive remedial action for the BPSOU and designed to meet RAOs, remedial goals (RGs), and performance standards. In the ROD, EPA identified site-specific human health and environmental RAOs and RGs for groundwater, surface water, stormwater, soils, indoor dust, and mining-related wastes in the BPSOU. RAOs are the final media-specific (e.g., solid media, groundwater, and surface water) statements regarding the objectives to be achieved by the remedial action. They address the various COCs, media of concern, exposure pathways and receptors, and current and likely future land use in the operable unit (OU). RGs are numerical cleanup goals for environmental media. The RGs are based on ARARs or are the result of baseline risk assessments for the BPSOU. Remedial actions implemented for the purpose of meeting RGs are intended to result in attainment of RAOs. The RAOs for contaminated surface water specified in the ROD for BPSOU (EPA and MDEQ 2006) were as follows:

- *Prevent ingestion or direct contact with contaminated surface water that would result in an unacceptable risk to human health.*
- *Return surface water to a quality that supports its beneficial uses.*
- *Prevent source areas from releasing contaminants to surface water that would cause the receiving water to violate surface water ARARs and RGs for the OU and prevent degradation of downstream surface water sources, including during storm [wet weather] events.*
- *Ensure that point source discharges from any water treatment facility (e.g., water treatment plant, wetland, etc.) meet ARARs.*
- *Prevent further degradation of surface water.*
- *Meet the more restrictive of chronic aquatic life or human health standards for surface water identified in Circular DEQ-7 ([ROD] Table 8-2) through the application of B-1 class standards. [Applies to base and normal high flow conditions. Acute aquatic life standards apply to wet weather conditions.]*

One of the RGs for the BPSOU is to return the reach of SBC within the BPSOU to its beneficial uses, which include supporting a self-sustaining trout fishery. This implies that arsenic and metals concentrations and other chemical components in surface water and sediments cannot pose adverse effects to any life stage of fish, including the more sensitive larval and early fry stages, and the important prey species consumed by trout, such as benthic macroinvertebrates.

3.2 Performance Standards

The ROD defines performance standards for surface water as narrative and numeric water quality standards, which are described in Section 8 and Appendix A of the ROD. The most pertinent numeric standards for the BPSOU surface water COCs are shown in Table 3-1. These standards apply to point sources and as in-stream standards.

For base flow and normal flow, chronic aquatic life and human health standards promulgated under Circular DEQ-7 (February 2006) are the required performance standards. The arsenic standard is a human health standard and is based on the maximum contaminant level, which was adopted by the state. The standard for aluminum is based on dissolved concentrations; all other standards are based on the total recoverable amount of the identified chemical, which is intended to protect organisms from other exposure pathways beyond water (e.g., contaminated sediment). For stormwater runoff conditions or wet weather flows, acute aquatic life standards promulgated under Circular DEQ-7 (February 2006) are the required performance standards. The BPSOU ROD does not identify human health standards for wet weather flows.

Table 3-1 Numeric Surface Water Quality Performance Standards

Contaminant	Human Health Standard (µg/L)	Chronic Aquatic Standard (µg/L)	Acute Aquatic Standard (µg/L)	Notes
Aluminum	--	87	750	Dissolved fraction
Arsenic	10	150	340	
Cadmium	5	0.097	0.52	Hardness-dependent
Copper	1,300	2.85	3.79	Hardness-dependent
Iron	--	1,000	--	
Lead	15	0.545	13.98	Hardness-dependent
Mercury	0.05	0.91	1.7	
Silver	100	--	0.374	Hardness-dependent
Zinc	2,000	37	37	Hardness-dependent

Note: All performance standards are based on total recoverable analysis except for aluminum. Standards for cadmium, copper, lead, silver, and zinc are hardness-dependent. Values shown are calculated at a total hardness (as calcium carbonate [$CaCO_3$]) of 25 milligrams per liter (mg/L) (Montana Numerical Water Quality Standards, Circular DEQ-7, February 2006).

µg/L – micrograms per liter

Hardness-dependent standards are variable based on formulae contained in Circular DEQ-7, February 2006 edition. Values in this table are calculated at a total hardness (as $CaCO_3$) of 25 mg/L.

Results indicated as normal flow (base and normal high flow) are assumed in this report to be equivalent to a 4-day average. A 4-day average of concentrations greater than the chronic performance standard is determined to be an exceedance. Results indicated as wet weather flow

in this report are assumed to be equivalent to a 1-hour average. A 1-hour average of concentrations greater than the acute performance standard is determined to be an exceedance.

In addition, the dissolved oxygen concentrations must not fall below 3.0 mg/L; the pH must be maintained within a range of 6.5 to 9.5; the physical properties (e.g., temperature, turbidity, solids [floating or suspended], and color) that will or are likely to create a nuisance or render the water harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or wildlife must not be increased; and discharges of toxic, carcinogenic, or harmful parameters must not be allowed that may commence or continue that lower or are likely to lower the overall quality of these waters.

All substantive requirements of the Montana Pollutant Discharge Elimination System (MPDES) must be adhered to for point sources addressed or created in the remedial process. For B-1 classification waters (Blacktail Creek and Grove Gulch Creek), non-degradation rules require that any surface water below any of the above standards must be maintained and protected unless degradation is allowed under the non-degradation rules. SBC is categorized on the Clean Water Act Section 303(d) list as impaired (not fully supporting all beneficial uses) due to impacts from abandoned mine lands. Blacktail Creek and Grove Gulch are not on the 303(d) list.

In-stream sediments are not specifically addressed in the RGs. However, one goal of the previous response actions and future remedial actions for the BPSOU is to eliminate or minimize sources of contamination to SBC sediment (i.e., surface water transport of contaminated soils or waste) such that excessively contaminated sediments are not present. Sediments in LAO were substantially addressed during the LAO ERA when a portion of the SBC channel and floodplain were reconstructed through the LAO. Additional sediment removal upstream of the reconstructed reach was required in the ROD and is discussed further in Section 7 as a TE and in Appendix A, surface water characterization report (SWCR) (EPA and MDEQ 2017).

3.3 Points of Compliance

Water quality performance standards are applicable to all surface water at all times. The ROD specified minimum sampling locations to evaluate compliance as follows:

> *"In-stream surface water quality must meet surface water ARARs during normal flow conditions. Surface water flow and chemistry will be collected at least monthly from compliance monitoring stations GG-01 (Grove Gulch); SS-04 (Blacktail Creek); and stations SS-05, SS-05A, SS-06A, SS-06G, and SS-07 in Silver Bow Creek."* [ROD pg. 12-60]

> *"Compliance during wet weather conditions means consistently measuring concentrations of COCs at in-stream compliance monitoring locations that are below the Montana* [Circular] *DEQ-7 acute aquatic life standards (Table 8-1). This ROD establishes points of compliance for wet weather conditions at monitoring stations GG-01 (Grove Gulch), SS-04 (Blacktail Creek), and stations SS-05, SS- 05A, SS-06A, SS-06G, and SS-07 in Silver Bow Creek."*[ROD pg. 12-62]

It should be noted that station GG-01 (Grove Gulch) is no longer sampled due to very low flow though it is noted it could still be a loading source to SBC via groundwater contributions.

Stormwater outfalls and surface water in upper SBC are not included as points of compliance under the ROD. Therefore, contaminant loads contributed by these discharges that increase concentrations do not count as exceedances of water quality performance standards in surface water. Regulations governing CERCLA cleanups, known as the NCP, allow for the refinement of compliance points during remedial design/remedial action (RA) activities.

3.4 Selected Remedy for Surface Water

The selected remedy for surface water is directed at achieving the primary objectives of returning SBC to its beneficial uses and protecting downstream receptors from releases of contamination from BPSOU. In accordance with the ROD, the selected remedy will protect human health and the environment, achieve water quality performance standards for COCs in Grove Gulch, Blacktail Creek, and SBC, and meet all ARARs that are not waived. The selected remedy for surface water consists of the following components:

- Surface Water Management Program. This program uses BMPs and engineered controls to address runoff of contaminated stormwater and snowmelt and specific capping and other measures described in the ROD. Under the ROD, BMPs and engineered controls include but are not limited to source controls on mine wastes or contaminated soil with arsenic and lead concentrations below human health action levels but with elevated concentrations of other COCs, temporary or permanent engineered sediment controls, curb and gutters to channel run-on and runoff away from source areas, detention/retention basins within stormwater drainage basins to reduce (detention) or capture (retention) storm flows and reduce suspended sediment loads from defined precipitation events, routing of storm flows away from receiving surface water (i.e., to the Berkeley Pit or to isolated areas or sedimentation basins), and removing source materials to a repository. This component has been partially implemented by construction of additional capped source areas, concrete stormwater channels, stormwater diversion channels to the Berkeley Pit, curb and gutter programs, stormwater sediment cleanout, retention/detention ponds (catch basins) in select areas, and hydrodynamic devices. Additional BMPs and engineered controls are required to meet RAOs; the ROD calls for a multi-year iterative BMP program.

- Source control along streams. Removal of wastes, contaminated soil, and sediments along the surface water bodies in the OU is required as described in the ROD. In addition to the removals previously conducted at LAO, removal actions are required from above the confluence with Blacktail Creek and upper SBC (formerly known as Metro Storm Drain) to the beginning of the reconstructed SBC channel. This action began in October 2010 with removals in the Golden Triangle area, including along the banks of Blacktail Creek from Montana Street to George Street. Mine waste in the streamside Blacktail berm south of George Street also must be addressed.

- Hydraulic control, capture, and treatment of contaminated groundwater. Capture systems have been implemented at upper SBC (formerly known as the “MSD subdrain” and now referred to as the “BPSOU subdrain”) and at LAO with the captured water treated at the BTL. Since initial design and construction, these capture and treatment systems have undergone evaluation, redesign, and upgrades as part of the RA to ensure effectiveness, permanence, and ARAR compliance (see Section 3.1). Further upgrades may be required

after additional characterization of the groundwater and BPSOU subdrain system. This evaluation is ongoing.

- Monitoring of surface water. Monitoring includes in-stream and stormwater system outfall locations. Contingency actions may be required if monitoring indicates the remedy is not meeting RAOs.

Contingency elements include:

- Additional groundwater capture and treatment. If the surface water is still impacted or ARARs are not met following the additional streamside removal action or other groundwater control actions described in the ROD, then additional hydraulic controls and/or groundwater capture and treatment will be required. This contingency has not yet been required and is awaiting determination of whether surface water ARARs are being met.

- Capture and treatment of stormwater. If the surface water management system described in the ROD, including BMPs and engineering controls, does not achieve the RAOs, such as returning SBC to its beneficial uses and meeting ARARs, further efforts at capture and engineered treatment of stormwater or snowmelt will be required. This contingency has not yet been implemented.

- Flow augmentation. Following implementation of the remedial actions and contingency measures required by the ROD, the addition of clean water flow may be considered to meet the RAOs and ARARs.

3.5 Previous Surface Water Interpretation Reports

Several surface water quality evaluations were undertaken prior to the preparation of the ROD. These have been summarized within the ROD and include:

- CH2M Hill and Chen Northern 1990. *Silver Bow Creek Phase II RI Data Summary, Area One Operable Unit*. CH2M Hill, Inc. and Chen Northern, Inc. August 29, 1990.

- PRP Group 2002. *Phase II Remedial Investigation Report, Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund Site*. Prepared for the PRP Group by McCulley, Frick & Gilman Inc. April.

- MFG, Inc. 2003. *Addendum – Final Phase II Remedial Investigation (RI) Report, Butte Priority Soils Operable Unit (BPSOU)*. Prepared for the PRP Group by MFG, Inc. May.

- PRP Group 2004. *Feasibility Study Report, Phase II Remedial Investigation/Feasibility Study, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area Superfund Site.* Prepared for the PRP Group by McCulley, Frick & Gilman Inc. April.

Furthermore, AR, on behalf of the BPSOU's PRPs, continues to collect surface water data as part of the evolving *Draft Surface Water Interim Monitoring Plan (IMP)* (AR 2007), the 2013 draft IMP revision (AR 2013a), and the revised draft IMP (AR 2014). The draft IMP has not received final approval from the agencies. The long-term program has not yet been written. Data collected

under the IMP and the reports identified above have been determined usable in accordance with the quality assurance project plan for the use of existing data (CDM Smith 2014).

The most recent surface water interpretation report is the SWCR (EPA and MDEQ 2017). This report primarily includes data analysis and discussion of IMP data obtained from 2008 through 2013.

3.6 Response Activities before the Issuance of the ROD

The ROD described the response activities undertaken at the BPSOU up to 2006. Response actions were carried out for several media during this time frame to address specific risks and contamination sources. Summaries of the risks and removal actions are presented in the ROD.

The primary activities conducted to improve surface water quality included:

- Removal of waste and reconstruction of the SBC channel from BRW to station SS-07
- Installation of the hydraulic control channel (HCC) and construction of the BTL groundwater treatment system at LAO
- Installation of the BPSOU subdrain and reconstruction of the upper SBC channel
- Reclamation of source areas throughout the OU
- Installation of a variety of stormwater and snowmelt controls

3.6.1 Previous Response Actions Affecting Base Flow and Normal High Flow Surface Water Quality

Several response actions have been implemented to address water quality issues during base flow and normal high flow. The largest source of impacts to normal flow surface water quality within the BPSOU was contaminated groundwater inflow. The most significant known sources of inflow that affected base flow and normal high flow included upper SBC, LAO, and the area between the upper SBC and LAO. Additional sources may have existed but were masked by inflows from these sources.

3.6.1.1 Lower Area One

Before remedial actions were conducted, SBC flowed along the edge of tailings placed within its floodplain. At high flows, tailings were mobilized and severely impaired water quality. In addition, groundwater within the LAO was severely impaired, and the contaminated alluvial aquifer discharged to surface water, impairing surface water quality at low flows. These two sources of metals caused severe degradation of water quality at all flow regimes.

Lower Area One Manganese Removal (1992). This removal action involved the removal of 261,000 cubic yards of manganese-impacted ore stockpiles within the floodplain of SBC. The piles were located east of the Metro Sewage Plant and west of Montana Street in LAO. The Defense Logistics Agency and EPA conducted the manganese removal; the stockpiles were moved to a private repository in Whiskey Gulch. The stockpiles included ore and process tailings remaining

after efforts by the Department of Defense to process manganese ore at the BRW plant during World War II.

Lower Area One Response Actions (1992–present). Response actions in LAO focused on the removal of accessible mine waste and contaminated soils along SBC and across the floodplains associated with SBC in the area of the historic Colorado Tailings and BRW facilities. The stream channel was reconstructed using clean materials, and the stream bed was elevated to prevent groundwater from entering surface water. Per the work plan, the response action was to be accomplished in three phases. Phase I included the excavation, transportation, and disposal of tailings and other contaminated materials from LAO; partial backfilling of the site with clean materials; and construction of a new SBC channel. Phase II was an equilibration and monitoring period that involved the collection of groundwater and surface water data to determine the appropriate final response action at LAO. Phase III included capture and treatment of contaminated groundwater in LAO, final reclamation, and land use planning for this area.

Lower Area One Groundwater Collection and Treatment System. A groundwater collection system was constructed to capture all contaminated shallow groundwater and prevent it from discharging to surface water. The captured groundwater is sent to the BTL, with lime-treated effluent meeting surface water quality performance standards discharged to SBC.

Surface water monitoring results collected following the construction of the groundwater collection and treatment system indicated prior response actions had reduced loading of metals to surface water.

3.6.1.2 Upper Silver Bow Creek

Historically, the upper SBC discharged a base flow of contaminated surface water. This base flow was derived from discharge of contaminated groundwater within the upper SBC area. The base flow caused degradation of surface water quality in SBC at the confluence with and downstream of the upper SBC. Additionally, this contaminated groundwater mixed with contaminated wet weather runoff before discharging to SBC.

AR constructed a large subdrain beneath the channel of upper SBC to collect contaminated groundwater within the upper SBC area and prevent contaminated base flow from entering surface water. The subdrain also separated groundwater from stormwater runoff. The collected groundwater is routed to BTL for treatment. Following the completion of this remedial work, surface water monitoring indicates loading of metals to surface water has reduced during base flow and normal high flow conditions. As required by the ROD, an evaluation of the BPSOU subdrain is ongoing, and the results of that evaluation may necessitate modification of the BPSOU subdrain.

3.6.1.3 Area between Upper SBC and LAO

The area located between the upper SBC and LAO groundwater capture systems includes several potential sources of contamination.

3.6.2 Previous Response Actions Affecting Wet Weather Runoff Quality

A significant number of actions have been completed that addressed or otherwise affected wet weather runoff quantity and quality. These activities were conducted as response actions before

remedy selection and were undertaken to address the immediate human health and environmental problems at the BPSOU. Two types of actions were undertaken: waste removal/site reclamation at source areas and the implementation of stormwater BMPs and controls. Virtually all of this work was carried out by the PRPs under unilateral or administrative consent orders. Before the final FS and remedial decision process, 422 acres of land within the BPSOU had undergone extensive response actions. The work was completed from the late 1980s through 2004, with response actions summarized below.

Walkerville TCRA (1988). Addressed mine waste dumps (e.g., Lexington Mine Yard) and residential soil areas contaminated with lead greater than 2,000 mg/kg or mercury greater than 10 mg/kg in Walkerville. Nearly 300,000 cubic yards of material were removed from 10 sites. In addition, 1 mile of rock-lined ditch was also constructed to control surface water runoff from the recontoured waste piles. EPA also removed contaminated soil from six earthen basements and 33 residential yards.

Timber Butte TCRA (1989). Approximately 40,000 cubic yards of contaminated soil were removed and consolidated in an on-site repository. Following the disposal of materials, the site was recontoured, covered with fill soil, and revegetated. Drainage at the site was also improved by recontouring and installing drainage ditches. In addition, contaminated soils were removed from two residential yards, recontoured, covered with soil, and revegetated.

Butte Priority Soils TCRA (1990 and 1991). Risks were mitigated for a number of mine waste dumps, a concentrate spill, and seven residential yards located in Butte and Walkerville. Remedial actions were undertaken at 30 waste dumps (100,000 cubic yards) that were either capped or removed; a railroad bed and seven residential yards were also reclaimed. These actions included removing waste, adding lime rock, capping with soil, applying fertilizer, and seeding each site.

Colorado Smelter TCRA (1992). Approximately 40,000 cubic yards of mine waste associated with the operation of the Colorado Smelter were removed and consolidated in an on-site repository, with the site reclaimed and drainage channels installed.

Anselmo Mine Yard and Late Acquisition/Silver Hill TCRA (1992). Mine waste was excavated from a mine yard and several mine dumps in Butte. The areas were recontoured, capped, and revegetated. Terracing, rock-lined ditches, and other drainage control measures were used for stormwater management.

Walkerville II TCRA (1994). EPA conducted further removal activities in Walkerville to address four additional dump areas containing elevated lead levels in soils. In 1994 and 1995, 12 more waste dumps were removed or capped in place.

Railroad Beds TCRA (1999–2004). Railroad beds and adjacent residential yards in the OU containing elevated concentrations of metals and arsenic were mitigated. The railroad beds were constructed using mining-related waste or contaminated by spillage during transport of ore or ore concentrates. The TCRA included significant stormwater drainage improvements.

Stormwater TCRA (1997–2006). Activities commenced in 1997 to address existing stormwater issues in Butte. The objective was to control stormwater flow and minimize soil erosion and the transportation of contaminated sediment to SBC. This was undertaken by constructing,

stormwater conveyance structures and by reclaiming large areas of barren land and contaminated soil with cover soil and revegetation. Stormwater channels and detention ponds were placed in critical areas to minimize erosion and reduce the release and transport of contaminants from historic mining areas.

This response action also included reclamation of the Alice Dump and the removal of approximately 50 cubic yards of soils contaminated with elemental mercury in the Dexter Street area. The Alice Dump is a large waste rock dump in upper Missoula Gulch that contained approximately 2 million cubic yards of contaminated soil and waste rock. At Dexter Street, a limited quantity of the mercury-contaminated soils failed toxicity characteristic leaching procedure and required disposal at an EPA-approved Resource Conservation and Recovery Act (RCRA) hazardous waste disposal facility. The remaining soils were disposed of at an on-site waste repository.

Walkerville TCRA (2000). Residential properties in Walkerville that had not been sampled previously were sampled, and reclamation was carried out at residences with concentrations of arsenic, lead, and/or mercury that exceeded action levels. Approximately 40 properties were addressed.

BPSOU ERA Residential Soils/Source Areas (1994–present). EPA implemented a program to remediate residential metals and arsenic that focused on certain residential areas with concentrations of lead in soil above the residential lead action level (1,200 mg/kg) and the arsenic level of 250 mg/kg. Under this action, EPA, MDEQ, Butte-Silver Bow County, and AR integrated the removal of residential lead-contaminated soils associated with mine-related wastes and the removal or mitigation of lead contaminants from non-Superfund sources. The source area portion of this action included the remediation of areas that were above the commercial/industrial lead action level of 2,300 mg/kg.

Old Butte Landfill/Clark Mill Tailings (1998). The site consisted of a 60-acre impoundment with approximately 1 million cubic yards of mill tailings immediately adjacent to, and partially mixed with, the old Butte Municipal Landfill. The mixed nature of the wastes necessitated a combined Superfund and RCRA response action to be performed under RCRA jurisdiction. At the Clark Mill Tailings, approximately 800,000 cubic yards of the Colorado Tailings removed from LAO were placed in the repository constructed at the site. The overall design included the subsequent construction of a recreational complex on top of the repository that included several irrigated ball fields, play areas, and park buildings.

3.7 ROD Requirements for Wet Weather Surface Water Monitoring and Management

The ROD outlined specific elements of the Surface Water Management Program to be conducted as a part of the selected remedy. One of those elements was the ongoing evaluation of BMPs to address wet weather contamination to surface water. The Surface Water Management Program employs a diverse range of BMPs to control loading of heavy metals and arsenic to SBC, Blacktail Creek, and Grove Gulch during wet weather water flow conditions. Elements of this program include:

- Monitoring. Surface water monitoring is performed to measure progress in achieving surface water quality performance standards during wet weather water flow. It is also performed to measure the performance of the BMPs implemented in the preceding cycle to provide data for analysis of compliance with action levels and performance standards and to evaluate the degree and location of continued contaminant loading to receiving surface waters.
- Compliance Analysis. Analysis of data to evaluate compliance with performance standards.
- Loading Analysis. Assessment of contaminant loading to receiving surface waters to help identify potential loading sources and assist in determining where new BMPs may be needed.

BMP development and implementation requirements for the Surface Water Management Program are as follows:

- BMP Selection. Specific new BMPs (type and location) will be identified and prioritized based on the previous steps and other indicators.
- BMP Implementation. BMPs will be implemented to address compliance with RGs.

The ROD also required development of:

> *…an EPA-approved comprehensive, long-term surface water monitoring program that will include collection of compliance and diagnostic flow and chemistry data for normal and wet weather conditions in receiving water and intermittent stormwater conveyances at the BPSOU*.

The surface water monitoring program has been conducted under the 2007 draft surface water IMP (AR 2007), the 2013 draft IMP revision (AR 2013a), and the revised draft IMP and addendums (AR 2014). The revised draft IMP and addendums had not received final approval from the agencies for the 2013 and 2014 seasons at the time of sampling. In addition, the long-term program has not yet been written.

3.8 Surface Water and Sediment Data Collected Since the ROD

With completion of a variety of response actions before the ROD and continued implementation of certain aspects of the ROD after it was issued, EPA determined that a renewed, post-ROD evaluation of surface water conditions within the BPSOU was warranted. The ROD required PRPs to conduct ongoing monitoring of surface water and provide annual data summary and interpretation reports; however, the interpretation reports have been submitted sporadically and have not been officially approved by EPA and MDEQ. Instead, in October 2008, EPA prepared the *Final Surface Water Characterization Report, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area National Priorities List Site, Butte, Montana* (EPA 2008) to summarize and interpret surface water quality data collected in the BPSOU since 2005. This data interpretation report was based on data collected and published by PRPs in their *Draft Data Summary and Interpretation Report, Base Flow and Wet Weather Data, October 2006 – December 2007* (AR 2008a) and on the database provided by AR that included surface water data from before 2000.

The SWCR (EPA 2008) presents EPA and MDEQ's interpretation of the data and provides recommendations and requirements for meeting the RAOs contained in the ROD. Moreover, a supplementary report to the 2008 SWCR was finalized in 2017, summarizing and interpreting surface water data collected at the BPSOU site from 2008 through 2013 (EPA and MDEQ 2017). A copy of this report is provided in Appendix A.

3.9 Remedial Activities Following the Issuance of the ROD

After issuance of the ROD in 2006, the following remedial activities have been undertaken within the BPSOU:

- Operation and maintenance of the groundwater capture system – upper SBC, BRW Ponds, and HCC. This includes reevaluation (such as upper SBC tracer testing) and upgrades of the system, as necessary
- LAO operations, including operation and upgrades of the BTL treatment facility
- Remediation activities at the BRW
- Removal of contaminated material and rehabilitation of the SBC stream banks
- Completion of first, second, and third cycle BMPs, including storm sewer cleanouts and installing sediment basins, slip lining, curb and gutter, hydrodynamic devices, and source area controls

3.9.1 BPSOU Subdrain

The BPSOU subdrain was constructed between 2004 and 2005 directly beneath the upper SBC channel to capture contaminated groundwater that was previously entering the upper SBC channel and discharging into SBC. The system was installed during the reconstruction of the upper SBC channel and designed to separate groundwater and surface water within the channel by using both barriers and hydraulic control. Several cleanouts and five manholes were installed within the subdrain. Water collected within the subdrain is directed to a pump vault where it is transported to the HCC via a pipeline and treated at the BTL.

The ROD (EPA and MDEQ 2006) required COC loads entering the subdrain to be measured on a yearly basis during the fall to assess the effectiveness of capture. Flows were measured in March 2005 and September 2009 using a Marsh-McBirney flow meter and a fluorescent dye tracer study, respectively. The quality of the flow measurements using the fluorescent dye test was found to be inadequate, and an explanation of significant differences was prepared that changed the flow measurement method from dye tracers to dedicated flumes within a series of manholes (EPA 2011).

Four additional manholes were installed between 2009 and 2010 (for a total of five) to replace existing cleanouts within the subdrain. Flow was measured in November 2011 using a combination of dedicated flumes and flow meters. Results have indicated cadmium, zinc, and copper concentrations have decreased within SBC following the installation of the BPSOU subdrain.

3.9.2 Lower Area One Operations

Originally constructed in 1997 as a 100 gallons per minute (gpm) pilot test and expanded multiple times as additional pilot testing, the BTL were designed to remove metals from area groundwater using a lime precipitation process. Upgrades to the lagoons were recently carried out in two phases:

- Phase I was completed between the fall of 2012 and the spring of 2013. The upgrade included the construction of a new influent pump station, two new pipelines between the pump station and the chemical addition system building, pond outlet structure repairs, and a new effluent sampling building.
- Phase II involved the construction of a new operations building, a new dredge storage building, expansion of the chemical addition system building, pond embankment modifications, and a major supervisory control and data acquisition (SCADA) upgrade.

3.9.3 Butte Reduction Works Remediation

The BRW ponds (BRW-01 West, BRW-01 East, and BRW-00) were created during tailings removal activities in the late 1990s to facilitate the collection of groundwater within the project boundary.

An investigation was undertaken by AR in 2008 (AR 2008b) to determine the effect of manipulating local groundwater levels and stream stage on copper concentrations within SBC. The investigation involved drawing down the water table north of SBC to prevent groundwater from impacting the surface water near station SS-05.9. Results of the study indicated a relationship existed between the relative stage of the stream and the adjacent water table elevation and total recoverable copper concentrations in SBC. When the stream stage was significantly higher than the groundwater, the copper concentrations in SBC were lower.

As a corrective measure, a groundwater interception pond was constructed at the eastern end of the site, adjacent to the slag tunnel. Approximately 1,270 cubic yards of mine waste were also removed during excavation activities. The interception pond was designed to conduct groundwater to the BRW-00 pond via an 18-inch pipe. The BRW-00 pond and the adjacent BRW-01 East pond were also graded to promote drainage into an outlet structure, conducting water to the HCC (Pioneer Technical Services [Pioneer] 2012). A follow-up study (Pioneer 2012) showed the interception pond effectively reversed the groundwater gradient away from SBC, eliminating the slag tunnel seep and any subsurface groundwater flows into the creek.

3.9.4 Silver Bow Creek Stream Channel Remediation Project

The Silver Bow Creek Bank Reclamation RA consisted of the following components:

- Stream bank reclamation:
  - A 12-inch maximum removal and riprap stabilization was performed in areas of existing infrastructure, including structural improvements (bridges) and underground utility improvements.

  - Other areas required entire stream embankment removal and reconstruction with clean fill.

- Floodplain reclamation:
  - Areas of higher contamination required removal to a depth of approximately 2 feet, graded to drain, covered with clean soil, and seeded.
  - Areas of lower contamination required the area be graded to drain, covered with clean soil, and seeded.

Construction began October 2010 and was completed by May 2011. Approximately 3.3 acres of floodplain along with approximately 1,935 linear feet of stream bank were addressed as part of this project. In addition, 7,200 cubic yards of impacted soil were removed from the site.

3.9.5 First, Second, and Third Cycle BMPs

The BMPs that have been implemented since 2008, as specified in the ROD, include:

- Storm sewer cleanout – General maintenance and improvement projects intended to improve water quality in stormwater effluent.
- Storm sewer slip lining – Construction was performed in two phases. In Phase 1, 3,800 feet of spiral wound polyvinyl chloride (PVC) pipe was installed and grouted from Woolman to Porphyry Street. In Phase 2, 3,166 feet of spiral wound PVC pipe was grouted in place from Porphyry Street south to the hydrodynamic device (HDD) at Webster Garfield School.
- Curb and gutter – To mitigate sediment loading to the existing Butte-Silver Bow (BSB) stormwater infrastructure and subsequently SBC, the following activities were implemented: saw cutting existing asphalt, preparing subgrade, constructing curb and gutter and valley gutters, adjusting existing stormwater inlets, pouring concrete collars around existing stormwater inlets, and placing asphalt patches to provide a transition from the newly constructed curb and gutter or valley gutter to the existing roadway.
- Hydraulic device installation – HDDs were installed to remove coarse-grained sediment from stormwater at sites, including Warren Avenue, Buffalo Gulch, Anaconda Road, Texas Avenue, and Montana Street.
- Source area control installation, which included:
  - Sediment basins – Concrete sediment structures were installed immediately upstream of existing stormwater inlet structures and storm channel reconstruction sites to mitigate sediment loading into existing stormwater infrastructure and soil erosion and provide a sediment storage device that is easily maintained. The sediment basins also comply with unilateral administrative order objectives.
  - 1S Agate Street – A new drop inlet was installed to direct runoff from a newly installed sediment trap to a new storm sewer main under Agate Street. Area grading was undertaken to direct existing surface flows to the sediment trap.

- Shields Avenue overpass – Work included debris removal, soil excavation and backfill, cover soil installation, geotechnical fabric installation, riprap installation, fertilizing and seeding operations, hydro-mulching, liming operations, and stormwater control construction.
- Idaho drainage – The previously installed drainage system saw the outflow pipe continuously blocked with sediment, impeding wet weather flows. A dual storm main was installed to create a clear flow path and divert wet weather flows away from an existing building, discharging from a constructed riprap outfall immediately above CB-9.
- Phase II source controls – The remediation of six separate source area control sites was completed by installing stormwater drop inlets, storm pipe, and manholes; removal and installation of pavement; site grading; cap and cover operations; fertilizing and seeding; constructing riprap structures; and constructing stormwater channels.

See Section 3 of the most recent BPSOU SWCR (EPA and MDEQ 2017) in Appendix A for a more complete description of the remedial actions undertaken within the BPSOU from 2008 through 2013.

3.10 Remaining Required Actions

Each of the main categories of the RA described in Section 3.4 has been implemented to a large degree; however, additional work remains to complete the implementation in full. Based on the requirements of the ROD and post-ROD investigations, additional primary activities should include:

- Continued implementation of BMPs, followed by continued iterative evaluation of BMPs over several years, which are designed to meet water quality performance standards
- Removal of the impacted sediment from SBC (as required in the ROD)
- Continued evaluation and upgrade of the BPSOU subdrain collection and vault system and the LAO facilities

3.11 Previous TI Waivers

A TI evaluation was completed by EPA for groundwater in the alluvial aquifer within BPSOU in 2006. Groundwater is significantly impacted by arsenic and metals from the widespread and long-term presence of mine and mineral processing waste throughout the area overlying the alluvial aquifer within BPSOU. Following massive removals in the LAO area, groundwater contamination remains, requiring long-term groundwater collection and treatment. The TI considered other actions, including massive removals of waste in the areas east of Montana Street, up to and including the Parrot Tailings, and additional groundwater collection and treatment.

The groundwater TI evaluation concluded that even with the most extensive practicable removal actions, some inaccessible waste would remain, and secondary contamination would remain in the aquifer requiring ongoing groundwater capture and treatment for an extended period. The

groundwater TI evaluation estimated that the alluvial aquifer would not attain standards within 100 years.

As a result, the BPSOU ROD waived groundwater standards and established a groundwater TI zone in the alluvial aquifer from the Parrot Tailings to the downgradient end of BPSOU.

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Section 4

Data Analysis

As discussed in Section 3, some of the of key remedial activities, including source area removal and capping, capture and treatment of groundwater, and the construction of various BMPs within the BPSOU boundary, were performed and mostly completed by 2011.

To determine current conditions, surface water quality monitoring is carried out at key outfall and instream sample locations, and data from 2011 through 2013 are presented and analyzed in the 2017 SWCR (EPA and MDEQ 2017). This report serves as an initial basis for understanding the current sources and distribution of metals concentrations in surface waters within the BPSOU and assists with targeting additional location and remedial measures within the BPSOU site. Although results outlined in the report indicate surface water quality has improved, exceedances of ARARs still occur regularly for multiple COCs during wet weather conditions and irregularly during base flow and normal high flow conditions.

Instead of repeating the interpretation of surface water data presented in the 2017 SWCR (EPA and MDEQ 2017), the report has been included as Appendix A. A brief summary of the key elements identified in the 2017 SWCR are presented in the following sections.

In the course of preparing this report, water quality data have continued to be collected. Data collected since 2013 and not presented in the 2017 SWCR are available and were evaluated for comparison to the data set used in the SWCR. This comparison is presented in a technical memorandum addendum to this report. The analysis concluded that newer wet weather data were not significantly different than those used in the TI evaluation. On this basis, the descriptive analysis of wet weather data in this section and predictive analysis in Section 7.2 are representative of current conditions. The evaluation further concluded that the base and normal high flow data were slightly different for two locations. As a result, the technical memorandum revised some of the analysis in Section 7.1 to arrive at slightly different numeric predictions, but conclusions drawn from the analysis were unchanged from that in Section 7.1. The analyses for base and normal high flow conditions were not revised in Section 4.4.1 and 7.1, but the conclusions in Section 7.1 and later sections are still valid.

4.1 Flow Regimes

As described in more detail in Section 1.3, surface water within the BPSOU is categorized into three different flow regimes and includes:

- Base flow – Times when groundwater inflow comprises the greatest percentage of flow within surface water. Both surface water and groundwater vary seasonally, but base flow is generally in late summer and winter and occurs when surface water conditions are fairly stable—not rising or falling and no stormwater runoff is occurring. For compliance, metals concentrations at base flow are compared to chronic aquatic life and human health performance standards per the ROD.

- Normal high flow – Subcategorized as elevated base flow conditions whereby no stormwater runoff is occurring, but flow conditions are elevated from saturated groundwater conditions (i.e., during spring melt periods). For compliance, metals concentrations at normal high flow are compared to chronic aquatic life and human health performance standards per the ROD.
- Wet weather flow – Defined as short duration periods when runoff is occurring from the Butte Hill as measured at storm drain outfalls and/or when samples are collected at any of the wet weather discharge points. In general, wet weather flow conditions are highly variable and typically occur during rainfall and snowmelt events from spring through late summer and early fall. For compliance purposes, metals concentrations in samples collected during wet weather flow conditions are compared to acute aquatic life performance standards per the ROD.

4.2 Available Data

4.2.1 Wet Weather Conditions

Data from main stem locations in Blacktail Creek and SBC both upstream and within the BPSOU have been assessed as part of this TI. Data were provided by AR's contractor, TREC, from April 2008 through June 2014 and include the following sample collection methods:

- ISCO[1] automatic time series sampler – first four to eight samples collected during a storm event
- DTEC Corporation (DTEC) automatic sampler – first flush samples collected
- Manual width-integrated sampling during base flow/opportunistic grab sampling during wet weather events at stations without ISCO or DTEC automated samplers

4.2.1.1 In-stream Stations

Wet weather data as part of this TI have been assessed from the following main stem sampling stations:

- SS-01 – upstream condition (Blacktail Creek near upstream BPSOU boundary)
- SS-04 (Blacktail Creek above upper SBC)
- SS-05 (SBC below its confluence with Blacktail Creek and below Buffalo Gulch)
- SS-05A (SBC below slag canyon)
- SS-06A (SBC below new channel from Catch Basin 9)
- SS-06G (SBC below treatment lagoon effluent)

These stations are shown on Figure 4-1. Station SS-01 was used only as the upstream condition for the upstream allowance (see Section 7.2.3 for further detail). Station SS-07 was not included

[1]Teledyne Isco (ISCO) automatic time series sampler

in the TI evaluation because it is influenced by the wastewater treatment plant discharge. Additionally, the wastewater treatment plant is likely influenced by infiltration and inflow during storms. Reliable data to address this condition do not exist; therefore, the TI analyzes data upstream of the wastewater treatment plant discharge point. Finally, it is possible additional sources may exist between SS-01 and SS-04 since the BPSOU boundary is located between these two sites, and this consideration will be addressed in the analysis for chronic performance standards.

Due to wet weather events and their subsequent effects being typically short-lived (flows only increasing for a period of a few hours or less), automatic samplers were relied upon for wet weather sample collection. Two types of automatic samplers—ISCO and DTEC—were utilized. ISCO samplers collected four to eight, 2-liter samples at 1-hour intervals, measuring concentrations throughout the storm hydrograph, and are located at in-stream stations in Blacktail and Silver Bow Creeks. For the purpose of this TI, only the first four samples from ISCO samplers were analyzed; however, during 2012 and 2013, up to an additional four samples were collected. Because these additional samples likely were collected after the wet weather event had passed, they were not included in the data set as they would have biased statistical measures used in the TI. DTEC samplers collect "first flush" samples and have been installed in subdrainages that are typically dry. If personnel are readily available, field grab samples are collected at various locations within the site. For analytical purposes, data from each sample collection method were combined.

4.2.1.2 Stormwater Input Stations

Data were available from several stormwater input locations, including:

- Texas Avenue
- Warren Avenue
- Buffalo Gulch East
- Buffalo Gulch
- Missoula Gulch
- Upper SBC

4.2.2 Base and Normal High Flow Conditions

Base and normal high flow sampling at main stem stations (SS-01 through SS-07) is conducted manually on a monthly basis. Effluent sampling is conducted by treatment plant operators and is not coordinated with main stem monthly sampling. As a result, effluent data are used on an average basis rather than synoptically.

Base and normal high flow samples were collected using width-integrated sampling in which the channel was divided into 5 to 10 equal intervals, depending on the width of the stream. At each width interval, a depth-integrated subsample was collected. The subsamples were then combined in equal volume to obtain the surface water sample.

4.2.2.1 Main Stem Stations

Monthly sampling is conducted at the main stem locations described in Section 4.2.1.1 and at the following locations:

- SS-01 (Blacktail Creek at Harrison Avenue; upstream of BPSOU; not collected in 2010)
- SS-05.7 (SBC in slag canyon)
- SS-05.9 (SBC below slag canyon)
- SS-06F (SBC downstream of BTL outfall)
- SS-06H (SBC upstream of Metro Sewage Treatment Plant [STP] outfall)
- SS-07 (SBC downstream of Metro STP outfall; downstream end of BPSOU; not collected in 2010)

4.2.2.2 Outfall Stations

Data are collected by treatment plant operators on varying schedules for the following locations:

- Montana Pole Treatment Plant
- BTL
- Metro STP

4.3 Upstream Sources

Station SS-01, located on Blacktail Creek at Harrison Avenue, is the farthest upstream station and considered a tributary, or boundary condition, and therefore represents water quality entering the OU. Monitoring data provide a comparison point between waters upstream and within the BPSOU and provide information on surface water conditions prior to entering BPSOU. Historic milling and smelting operations may have affected areas upstream of the BPSOU and SS-01. There is also a storm drain outfall immediately upstream of SS-01. The scope of these potential impacts has not been investigated (this outfall is the located upstream of the BPSOU).

Blacktail Creek from SS-01 to SS-04 is a low velocity, low gradient stream flanked by wetlands. This reach is also an area of known groundwater discharge (see AR Thermal Imaging and Montana Bureau of Mines and Geology [MBMG] bromide tracer dilution study [EPA 2015]). The vertical groundwater gradient for nested well pair AMW-13A/AMW-13B is slightly upward most of the year, which is consistent with a groundwater discharge area. Detailed sampling of water quality at base flow conditions was conducted during the sodium bromide tracer investigation (MBMG 2014). Dissolved copper concentrations were nearly constant from Oregon Avenue to the mouth of Blacktail Creek, indicating flow entering the reach was not increasing the dissolved copper concentration during the investigation. Dissolved zinc concentrations, however, increased by approximately 64 percent in a short reach, beginning ¼ mile upstream of Lexington Avenue to 300 feet downstream of Lexington Avenue, corresponding with groundwater gain in the area.

4.3.1 Upstream Water Quality

At SS-01, during base flow from 2008 through 2013, all copper concentrations are low and well below the chronic performance standard other than one potential outlier value in 2008. There is only a small separation between total recoverable and dissolved values, indicating that suspended sediments are comparatively low at SS-01 during base flow (Figure 4-2). Similar to copper, there has been one exceedance for lead during base flow from 2008 through 2013 (Figure 4-3). This exceedance also occurred in the same sample as referenced above. Aluminum, arsenic, cadmium, silver, and zinc had no base flow exceedances at SS-01 from 2008 through 2013. Detailed discussion of base flow compliance and loading analyses is provided in Sections 6 and 7 of the SWCR (EPA and MDEQ 2017) in Appendix A.

During normal high flow, loading of arsenic, copper, and iron from sources upstream of SS-01 is evident. From 2008 through 2013, the number of arsenic exceedances at SS-01 is similar to the number of exceedances at the downstream stations. Table 4-1 indicates 43 percent of arsenic loading occurs from sources upstream of sampling station SS-01; thus, the main source of arsenic (and iron) appears to be located upstream of the site.

Table 4-1 Largest Loading Sources of Total Recoverable Arsenic during Normal High Flow 2008–2013

Rank	Source	Type	Median Total Recoverable Arsenic Load (lb/day)	Percentage of Total Load[1]
1	Upstream of SS-01	Input	0.37	43%
2	SS-01 to SS-06G	Combined Reaches	0.37	42%
3	SS-STP	Input	0.085[2]	10%[2]
Individual Reaches				
4	SS-01 to SS-04	Reach	0.29	34%

[1] Total load includes inputs and reach loads but excludes load losses.

[2] The load based on difference in load from SS-06G to SS-07 is negative (loss). The load shown in this table is based on monitoring data discussed in Section 7.2.4 of the SWCR (EPA and MDEQ 2017).

lb/day – pounds per day

However, the number of copper exceedances at SS-01 (i.e., three) was comparatively fewer than the stations downstream for the period from 2011 through 2013 (Table 4-2), indicating that, while upstream sources of copper contribute to loading, other contributions of copper loading are present on-site during normal high flow.

Table 4-2 Largest Loading Sources for Total Recoverable Copper at Normal High Flow 2011–2013

Rank	Source	Type	Median Total Recoverable Copper Load (lb/day)	Percentage of Total Load1
1	SS-STP	Input	0.73[2]	39%
2	SS-01 to SS-06G	Combined Reaches	0.72	39%
3	Upstream of SS-01	Input	0.23	12%
Individual Reaches				
	SS-05 to SS-05A	Reach	0.50	27%
	SS-01 to SS-04	Reach	0.19	10%

[1] Total load includes inputs and reach loads but excludes load losses.
[2] The load based on difference in load from SS-06G to SS-07 is negative (loss). The load shown in this table is based on monitoring data discussed in Section 7.2.4 of the SWCR (EPA and MDEQ 2017).

Both arsenic and copper concentrations appear to be affected by discharge, with higher concentrations of each constituent observed during the normal high flows. Also, at SS-01, a 25 percent reduction in total recoverable copper during normal high flows appears to have occurred when the 2008 through 2009 and 2011 through 2013 periods are compared. This reduction may be attributed to a regional decrease in total recoverable copper related to a continuing trend or to climatic fluctuations. In any case, any evaluation should highlight the importance of considering upstream conditions outside of the BPSOU. Detailed discussions of normal high flow compliance and loading analyses are provided in Sections 8 and 9 of the SWCR (EPA and MDEQ 2017) in Appendix A.

Upstream wet weather copper has a high rate of exceedances (approximately 90 percent) at SS-01, indicating an upstream source of copper exists (Figure 4-4). Notable, although fewer, exceedances of cadmium (6 percent), lead (11 percent), and zinc (24 percent) also occurred at SS-01 during wet weather flows from 2008 through 2013. While sources upstream of SS-01 consistently contribute additional load, they are a much smaller magnitude than those within the OU. Detailed discussions of wet weather flow compliance and loading analyses are provided in Sections 10 and 11 of the SWCR (EPA and MDEQ 2017) in Appendix A.

4.4 Summary of 2008–2013 Water Quality Results in BPSOU

4.4.1 Base Flow Summary

Copper results show a considerable difference between dissolved and total recoverable concentrations at most stations, indicating that colloids or fine sediments containing copper are suspended in the surface water during base flow and that changes in water quality are occurring over the OU. From 2008 through 2010 (when construction to remediate the BRW seep was completed), total recoverable copper exceeded the chronic performance standard on a regular basis, whereas from 2011 through 2013, far fewer exceedances occurred except at station SS-07 downstream of the Metro STP. For stations upstream of the Metro STP, copper exceeded the performance standard no more than once in the 3-year period of 2011 through 2013. The largest sources of copper loading during base flow are effluent from Metro STP (57 percent), combined OU reaches from unknown COC transport mechanisms (25 percent), and BTL (9 percent).

Station SS-06A had a total recoverable cadmium exceedance of the chronic performance standard with a sample collected prior to the bank sediment removal work in 2010. No other exceedances occurred from 2008 through 2013 at base flow.

One or two exceedances in total recoverable lead concentrations occurred at each station, including SS-01(except at SS-07) in the 6-year period from 2008 through 2013.

All sample results for total recoverable arsenic, silver, and zinc and dissolved aluminum from 2008 through 2013 are below the relevant performance standard. Surface water quality performance standards are being met during base flow conditions, with the exception of copper at SS-07.

4.4.2 Normal High Flow Summary

Copper concentrations are lower in the 2011 through 2013 period compared to 2008 through 2009, specifically following the BRW seep remediation and bank sediment removal in the SBC/Blacktail Creek confluence to Montana Street area by early 2011. From 2008 through 2009, total recoverable copper exceeded the chronic performance standard in 83 percent of sample results at stations SS-05A, SS-06A, and SS-07. Since 2011, total recoverable copper only exceeded the chronic performance standard in 10 to 15 percent of sample results at SS-05A and SS-06A, with the rate at SS-07 decreasing to 35 percent. The SWCR indicated that the largest source of total recoverable copper loading during normal high flow conditions includes discharge of effluent from the Metro STP and reach loading throughout BPSOU due to undifferentiated sources. With the exception of one outlier each, dissolved aluminum and total recoverable zinc were all below the chronic performance standard. Similarly, total recoverable cadmium concentrations were nearly all within chronic performance standards, with the exception of two outlier samples. No exceedances for silver were observed.

Arsenic and iron concentrations showed a general relationship to discharge—as discharge increases, arsenic concentrations also increase. Exceedances at the stations ranged from 13 to 18 percent for arsenic and 6 to 18 percent for iron. In general, concentrations of arsenic and iron were greater during spring runoff. There was little change in arsenic and iron concentrations between stations within the BPSOU (i.e., SS-04 to SS-07), indicating arsenic and iron are derived from upstream sources beyond the OU and outside the influence of remedy. Total recoverable lead concentrations were typically below the chronic performance standard, with the exception of two to three exceedances at each of the following stations SS-07, SS-05A, SS-05, and SS-04. These results were notably greater than the dissolved fraction and adjacent sample results and are related to suspended sediment.

Overall, the SWCR indicated that the largest source of loading to surface water for copper was the Metro STP, whereas on-site reach gains (highest between SS-05 to SS-05A) were sources of loading for both lead and copper. Based on a relationship between total suspended sediment and metals concentrations, sediment is a primary loading source for these two metals. Upstream sources were identified as the largest source of loading for arsenic and iron. Based on the exceedance rates, total recoverable arsenic, copper, iron, and lead are carried forward to the analytical part of the TI evaluation for normal high flow.

4.4.3 Wet Weather Flow Summary

Total recoverable copper concentrations always exceeded the acute performance standard at stations SS-07 and SS-06G and almost always exceeded the acute performance standard from stations SS-06A to SS-01 for both periods of 2008 through 2010 and 2008 through 2013 during wet weather flow periods. Wet weather concentrations exhibit no apparent trend. Dissolved copper at all stations appears to have decreased slightly from 2008 through 2013. The maximum copper concentrations were lower overall in the later period. The largest loaders were identified as: Buffalo Gulch (59 percent), upper SBC (25 percent), and SS-01 (11 percent). Further discussion of the copper results during wet weather flow is provided in Section 10 of the SWCR (EPA and MDEQ 2017) in Appendix A.

Samples also indicated a moderate number of exceedances for other COCs that were analyzed across the OU. Total recoverable arsenic exceeded the acute aquatic life performance standard only once—at SS-04. All other total recoverable arsenic concentrations were within the acute performance standard. There was a low number of exceedances at all main stem stations for total recoverable cadmium, with exceedances ranging from 3 to 13 percent.

A moderate number of exceedances of total recoverable lead was observed from 2008 through 2013; however, there were large variations in lead concentrations at SS-04 that are considered indicative of variability in the flushing of suspended solids during wet weather events. Total recoverable zinc exceeded the acute performance standard in approximately 50 percent of samples analyzed at stations SS-05 through SS-07. Similar to lead, there were large fluctuations in zinc concentrations between the minimum and maximum reported values. For example, at station SS-04, the total recoverable zinc concentrations ranged from 8.5 to 10,900 µg/L. These variations are likely due to resuspension of solids either from along the stream bank or from point sources along the creek.

The COCs copper, cadmium, lead, silver, and zinc are carried forward to the analytical section of the TI for wet weather conditions. The SWCR (EPA and MDEQ 2017) indicated that Buffalo Gulch and upper SBC are the largest sources of loading during wet weather conditions, with additional loading entering the site from upstream via the Blacktail Creek.

4.5 Other Relevant Data Summary

This section provides a brief summary of the other relevant data (noncompliance data) from Section 12 of the SWCR (EPA and MDEQ 2017) that discussed data from sources used to supplement or provide independent measures of water quality and flow data collected by AR on behalf of the PRPs. Available data were compared to BPSOU surface water data to assess accuracy of the metals data set.

4.5.1 Wet Weather Flow Data Summary

Wet weather flow and/or stage monitoring data were obtained from the surface water monitoring stations identified in various drainages in the BPSOU in accordance with the *Draft Butte Hill Diagnostic Surface Water Monitoring Plan* (AR 2013b). These drainages include Anaconda Road-Butte Brewery, Buffalo Gulch, Missoula Gulch, upper SBC, Texas Avenue, Warren Avenue, and West Side. Samples were collected during wet weather flow conditions (snowmelt runoff and during rainfall events) and analyzed for total recoverable and dissolved metals, including arsenic, cadmium, copper, lead, mercury, and zinc, and total suspended solids and sulfate.

Results for samples collected from all drainages indicated elevated concentrations of total recoverable copper in upstream and downstream stations. Results for samples collected at the Anaconda Road-Butte Brewery drainage sample location AR-CLV-2 indicated elevated concentrations of total recoverable copper at the upstream station with a median value of 1,400 µg/L; however, this sample is taken upstream of a catch basin on railroad property that has not discharged since it was constructed. In comparison, results for samples collected from the downstream stations have much lower total recoverable copper concentrations.

In Buffalo Gulch, the upstream station had the highest concentrations of total recoverable copper; however, these are fairly consistent with concentrations before and after the hydrodynamic device and the downstream sample location. Results at Missoula Gulch for total recoverable copper were variable throughout the drainage area, with samples from Missoula Gulch having the lowest concentration of any of the wet weather outfalls downstream of the CB-8 and CB-9 retention/detention pond BMPs. Results for total recoverable and dissolved copper concentrations along upper SBC were relatively similar between sample locations, with a slight decreasing trend from upstream to downstream. Results for total recoverable copper concentrations in the Warren Avenue drainage were relatively high compared to the other drainage areas.

4.5.2 Summary of Wet Weather Data for Sustained Periods

From 2008 through 2013, a series of incremental samples were collected using automated samplers over the course of individual wet weather events to characterize flushing of sediment and metals through the stormwater network. Total recoverable copper was selected for this evaluation because copper tends to be the most prevalent metal to exceed the acute performance standard. These first flush data were statistically evaluated at three stations, SS-07, SS-06A, and SS-05. The analysis concluded that during sustained wet weather, the peak concentrations generally occur within the first 3 hours of an event, and the variation between years is greater than the variation between samples in the first 3 hours of an event.

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Section 5

Conceptual Site Model for Surface Water

This section presents a review of the CSMs for the source and transport of COCs in SBC during base flow, normal high flow, and wet weather flow conditions. The basis of the CSMs was described in detail in the SWCR (EPA and MDEQ 2017). A CSM flowchart is included for base flow and normal high flow as Figure 5-1 and wet weather flow as Figure 5-2.

5.1 Base and Normal High Flow Conceptual Site Model

5.1.1 Sources

During base flow and normal high flow conditions, the three main metals-laden contaminant sources that impact SBC are:

- Mine waste (waste rock and tailings). The waste rock, tailing deposits, and other contaminated materials influencing surface water at the BPSOU are the result of 140 years of hard rock mining, smelting, milling, and other processing activities. Mining wastes were also utilized in the construction of railroad grades and embankments. Historically, significant quantities of mine waste were intentionally released into SBC to be carried off-site; thus, a sizeable amount of mine waste was deposited within the historic stream channel and in large impoundments constructed within the floodplain and low-lying wetlands. Tailings and mine waste leach metals to groundwater and cause groundwater contamination. Impacts to surface water have historically occurred via discharge of contaminated groundwater into SBC.

  Over 1 million cubic yards of tailings and waste were removed during the LAO removal action; however, significant quantities of mine waste remain in areas in the BPSOU that still contribute to groundwater contamination. SBC was reconstructed to be elevated above groundwater in LAO so that the contaminated groundwater would not discharge into the creek as long as groundwater interception systems are implemented and maintained. Subsurface mine waste still remains beneath the Metro STP and under the slag walls at the former BRW facility. These areas could contribute to the groundwater contamination and may contribute to surface water contamination if the contaminated groundwater is not successfully captured and treated or hydraulically prevented from entering surface water.

  Additionally, there are substantial deposits of tailings along the historic upper SBC corridor. Some of these include the Parrot Tailings, Diggings East, and the Northside Tailings, which are sources of groundwater contamination. EPA's position is that most contaminated groundwater, which formerly discharged directly into SBC, is now captured and pumped to the LAO for treatment.

- Mine waste in bank deposits and bed sediments. Another source of metals contamination is mine waste in bank deposits and bed sediments upstream of previously reclaimed reaches of SBC. Because SBC was the closest water source to the mines on the Butte Hill, numerous

milling and smelting plants were constructed along the creek for easy disposal of mine waste. Most of these contaminated sediments located in LAO were removed during the LAO reclamation phase. Bank sediments and floodplain deposits near the confluence of the upper SBC channel and Blacktail Creek were removed during the BPSOU Silver Bow Creek Stream Bank Reclamation Project in 2010 through 2011. The streambed sediments in the confluence area remain in place.

However, the reach between upper SBC and SS-05A (also known as slag canyon) and the berm area located just upstream of the confluence area remain unreclaimed. During seasonal normal high flows, bed sediments in portions of this reach are likely entrained and transported downstream.

In addition to the primary sources discussed above, sediments that have been in contact with low quality water in the past may contain metals adsorbed onto the surfaces of the grains. A recent sediment sampling event (TREC 2010) has shown that metals concentrations are consistently higher in the fine-grained fractions, which strongly suggests that the metals are adsorbed.

- Other upstream sources. The primary source of flow in SBC is inflow from Blacktail Creek. Elevated copper concentrations in Blacktail Creek during normal high flow conditions indicate that there may be contaminant sources or urban runoff effects upstream of the BPSOU. Base flow water quality entering the BPSOU from upstream rarely exceeds chronic water quality standards.

5.1.2 Pathways

During base flow and normal high flow conditions, the following pathways for contaminant sources exist (see Figure 5-1):

- Mine waste to groundwater to surface water. The unremediated area between the upper SBC and LAO includes the former BRW and slag canyon. Subsurface waste materials in the area remain in contact with and are a source of contamination to the alluvial groundwater system. Since the alluvial groundwater is contaminated, the responsible parties are required to collect and convey groundwater to the BTL via an interceptor trench. However, sampling demonstrated that some of this contaminated groundwater was entering SBC upstream of LAO. Investigation of this source in 2008 and 2009 identified seepage of highly contaminated groundwater to surface water in the BRW area. Remedial action to address this pathway included extension of the HCC and construction of groundwater collection features in the BRW area from 2011 through 2012. Ongoing monitoring will evaluate if additional sources remain in this area.

- The unreclaimed slag canyon reach of SBC (immediately upstream of BRW) has been classified as a transitional reach of SBC. This means the reach can be gaining groundwater, losing groundwater, or doing neither. These conditions can change seasonally. Mine waste deposits are present underneath the slag walls, which parallel and contain SBC. As groundwater passes through the mine waste deposits, it becomes contaminated. The BRW ponds and the extended BRW control channel are intended to capture this groundwater

and limit groundwater gain to surface water in the slag canyon area. Ongoing monitoring will evaluate if the BRW ponds and channel extension are effective.

- Contaminated groundwater may pass through bed sediments, and metals may attenuate, resulting in contaminated sediments. This pathway has not been confirmed.
- Contaminated sediments to surface water. Stream reaches from the mouth of Grove Gulch Creek to station SS-05A contain contaminated sediments within the banks and stream bed. During base flow, deposits of metals-impacted sediment can act as a continuing source of metals, especially in areas where the stream is gaining groundwater through the banks and bottom of the stream channel. The water passes through the impacted sediments, leaches metals, and enters the water column (surface water flow in the stream). During normal high flow, contaminated bank deposits and stream bed sediments are resuspended, increasing total recoverable metals concentrations. Resuspension also exposes sediment grains, allowing adsorbed metals to desorb into the water, increasing dissolved metals concentrations.
- A remedial action that removed contaminated materials was completed in 2010 through 2011 to address contaminated soil along the streambank at the confluence of Blacktail Creek and upper SBC. This is expected to address a potential source of metals loading to surface water in this area; however, bed and bank material remain in the Blacktail Berm area. Ongoing monitoring will evaluate if additional sources remain.

5.2 Wet Weather Flow Conceptual Site Model

5.2.1 Sources

The CSM for mine waste contamination of wet weather flow is similar to that discussed above for base flows and normal high flows; however, different sources of mine waste become pertinent during a wet weather flow event (See Figure 5-2).

Mine waste prevails in two major types (dumps and impoundments) and historic pipe bedding and backfill material used throughout Butte. All of the known sample locations of source areas where lead or arsenic exceeded solid media action levels for human health have been reclaimed or otherwise addressed by previous response actions. Additionally, most of the areas that contained elevated levels of copper and zinc were also reclaimed. Some mineralized areas, such as native soil or bedrock outcrops, have been reclaimed. They represent very small areas. Runoff from ubiquitous mine waste contamination continues to cause elevated metals and arsenic contamination in stormwater or snowmelt events. However, soil and/or sediments containing concentrations of COCs below the human health action level may still be a loading source to surface runoff and can be mobilized during wet weather events.

The stormwater infrastructure in Butte was historically constructed using conveniently available materials that tended to be waste rock. While some infrastructure has been addressed along trunk lines, an extensive network of laterals remains as a possible source of metals due to waste rock in pipe bedding or deposition of salts containing metals as a result of inflow of contaminated groundwater. There are continued contributions from drainages in the BPSOU during runoff events that indicate further action is warranted under the BMP program.

Another metals source to SBC during wet weather events is from surface water entering the BPSOU from upstream as described above. The area upgradient of the BPSOU has not yet undergone characterization. Upstream input to the compliance analysis of in-stream performance standards is required by the ROD and as such will be a component of this TI evaluation.

5.2.2 Pathways

During wet weather flow conditions, the following pathways for contaminant sources exist (see Figure 5-2):

- Surface runoff to storm sewer system to SBC. During wet weather flow events, surface water runoff may erode barren areas in the BPSOU and mobilize sediments with potentially elevated metals concentrations. Sediment-laden surface water then enters the municipal storm sewer system through a variety of catchment mechanisms, eventually discharging to SBC. Initial BMP actions, such as source area capping, the curb and gutter program, catch basin improvements, HDDs, and the initiation of sediment removal in the storm sewer system on a periodic base, have begun to address this pathway.

- Storm sewer system to SBC. Historically, mine waste and contaminated soils were readily available for use as pipe bedding, backfill for roads, foundations, and subsurface components of the stormwater system. The deterioration of the stormwater infrastructure allows for contaminated mine waste to enter into the tunnels and pipes. Additionally, water seepage through contaminated mine waste causes accumulation of evaporative metals salts within the storm drain infrastructure. During wet weather flow events, the accumulated sediments and salts are mobilized and transported to SBC. BSB has developed and begun implementing an important stormwater system assessment and improvement plan. EPA and MDEQ will work with BSB to ensure continued analysis and implementation of the plan. Additionally, as noted above, maintaining the stormwater system sediment cleanouts on a periodic basis and the addition of hydraulic control devices on stormwater outlets were identified and implemented as BMPs under the CERCLA BMP development program. Other BMP actions for the stormwater conveyance system may be identified in the future.

- Upstream sources to stormwater to SBC. During wet weather flow events, stormwater contained in Blacktail Creek above SS-01 shows elevated levels of total and dissolved metals. This potential contamination is occurring before entering the BPSOU. The causes of elevated metals in surface water upstream of the BPSOU await further investigation.

5.3 Overall CSM

5.3.1 Base Flow and Normal High Flow

Based on the above discussion, the overall CSM for the BPSOU can be developed. The elements include:

<u>Sources</u>:

- Mine waste (waste rock and tailings and other contaminated areas) via groundwater input

- Metals-laden sediment deposits distributed along and within the SBC channel (mine wastes and sediment with adsorbed metals)
- Upstream sources (not in the BPSOU)

Pathways:

- Fluvial movements during seasonal high flow
- Groundwater inflow
- Groundwater/Surface water interaction with contaminated sediment

A flowchart of the CSM for base flow and normal high flow is shown on Figure 5-1.

5.3.2 Wet Weather Flow

Sources:

- Mine waste (waste rock and tailings and other contaminated areas) via runoff and groundwater input
- Upstream sources (not in the BPSOU)

Pathways:

- Surface water runoff to stormwater to SBC
- Pipe bedding to stormwater to SBC
- Upstream sources to stormwater to SBC

A flowchart of the CSM for wet weather is shown on Figure 5-2.

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Section 6

Development of Stochastic Model for Prediction of Stormwater Quality

The BPSOU selected remedy for stormwater included the preparation and implementation of a Surface Water Management Program. The primary focus of the program is to systematically identify areas of stormwater contamination and implement appropriate BMPs to reduce the transport of contaminants to SBC. Prior to this TI evaluation and the ROD, stormwater BMPs were implemented in areas where erosion or routing problems were obvious and where sufficient space (Missoula Gulch) or elevation (Berkeley Pit diversions) were available to control stormwater runoff. These activities included reclamation of mine waste dumps, diversion of stormwater to the Berkeley Pit, installation of catch basins (e.g., Syndicate Pit and catch basins 8 and 9 in the Missoula Gulch drainage), and the capture and treatment of base flow groundwater in the upper SBC channel and Missoula Gulch.

Two cycles of upfront BMP management measures for the control and treatment of stormwater were implemented following the issuance of the ROD (EPA 2006). These included actions such as the beginning of a curb and gutter program in the BPSOU, regular sediment cleanout in the BSB stormwater system, catch basin improvements, and reclamation of additional source areas. Further detail on previous remedial actions is in Section 3.

Although these improvements have reduced contaminant loading, acute aquatic life performance standards continue to be frequently exceeded in SBC during wet weather events, often by orders of magnitude. Several additional contaminant sources are known to remain within the BPSOU, including the buried stormwater conveyance system and areas of exposed mine waste. These remaining issues are more widespread, and in areas with less open space for the construction of BMPs, making them more difficult to address.

These initial efforts and the subsequent extensive collection of data have led to a reevaluation of the surface water remedy. The initial step in such a reevaluation begins with modeling efforts using current data. Issues surrounding stormwater contamination in SBC were presented in the *Draft Technical Memorandum, Regulatory Considerations for Stormwater Management at the Silver Bow Creek/Butte Area NPL Site* (CDM 2000). Part of this evaluation included the development of a water quality model that predicted the probability of copper and zinc concentrations in SBC during storm events. The model used a stochastic approach to predict the probabilities of COC concentrations during different reoccurring interval storm events. Based on the conditions in the BPSOU that were used to develop the 2000 model, the model output predicted that even with removal of all stormwater loads, total recoverable performance standards could not be achieved consistently in SBC during a 2-year, 24-hour storm event.

In 2010, the 2000 stormwater evaluation was revised to include stormwater improvements carried out within the BPSOU in the years following that initial evaluation. The stochastic model was also revised to better identify the remaining major contributors to stormwater

contamination in SBC. In 2014, a reassessment of stormwater within the BPSOU commenced to determine, with increased certainty, whether acute total recoverable performance standards for the identified mining-related COCs could be met during wet weather events in SBC. This included further updates and revisions to improve the stochastic model by including a much larger data set as well as additional stormwater improvements undertaken within the BPSOU and further refinements to the model. The model was then run to simulate the effectiveness of a range and combinations of potential stormwater TEs. The TEs are a variety of stormwater BMPs that could realistically be implemented within the BPSOU. Total recoverable copper was identified as the metal most likely to exceed performance standards; therefore, modeling was performed only for total recoverable copper. Correlations were then developed between copper and other COCs, which allowed the model results to be applied to the other COCs, thereby determining what potential impacts the TEs would have on improving water quality within the BSPOU.

The development of the updated stochastic model is described in more detail in the subsections below. Section 6.1 provides a broad overview of the components of the model. Sections 6.2 and 6.3 describe how the model's hydraulic and chemical input parameters were constructed. Section 6.4 describes the validation of the model results. Section 6.5 discusses how the model input was compared to water quality standards. Section 6.6 discusses the methods used to simulate various TEs for the evaluation of alternatives. The details of the various TEs and the results of the modeling are presented in Section 7.

6.1 Overview of Stochastic Model Construction

Modeling stormwater quality requires a methodology to combine both stormwater flow and water quality. Stormwater cannot be modeled as a steady state system because flows and contaminant concentrations are highly variable during storm events. In general, a simple mixing model can only predict concentrations during steady state conditions or for one set of conditions at one point in time. Therefore, due to the uncertainty that is inherent in stormwater data, concentrations in SBC were stochastically modeled with a mixing model that used @Risk for Microsoft Excel.

@Risk is a stochastic modeling tool that incorporates and quantifies the uncertainty of specified input parameters by using Monte Carlo simulations to run a given model for a large number of iterations. The method is a powerful and effective tool for modeling stormwater quality. The model runs by randomly sampling input probability distribution functions (PDFs) for each stochastic parameter, with the resulting output presented in the form of a PDF that presents a range of expected values. The BPSOU stormwater quality model utilized @Risk to predict a range of possible total recoverable concentrations for copper at monitoring point SS-06G in SBC. These results were then correlated to assess additional total recoverable COC concentrations (zinc, lead, cadmium, and silver) in SBC during storm events. The output shows the probability that a certain concentration would occur (i.e., the concentration would be expected to be X µg/L, or greater, Y percent of the time). In addition, an input PDF for hardness at station SS-06G was developed for which the hardness-based standard for all of the applicable COCs was calculated and compared to the calculated result for each iteration of the model. This provided an exceedance percentage for each COC.

The foundation for the stochastic model is a spreadsheet mixing model that includes deterministic inputs for flow and stochastic inputs for copper concentrations for the Butte Hill and upper SBC drainage basins, Blacktail Creek, the Montana Pole and Treating Plant outfall, and the BTL outfall. The contaminant concentration and flow are used to generate a contaminant load from each model input location. The flow from most input locations is a hydrograph (Blacktail Creek is assumed to be steady-flow) such that there is a time series of flow data for the storm, and the model is broken down into 0.1-hour time steps. The load for each time step is calculated by adding each of the input loads together, then the concentration is back calculated within SBC at point SS-06G by dividing the total load at that location by the flow rate. A schematic of the inputs to the model is shown in Figure 6-1.

The stormwater model was created to reflect current stormwater hydrology and water quality conditions within the BPSOU. As-built drawings and other information on stormwater BMPs constructed over the last 20 years were used to ensure the HydroCAD hydrologic and hydraulic stormwater routing model is as accurate as possible. HydroCAD is a software program for modeling stormwater runoff and designing stormwater management systems. The water quality data used in the @Risk model include BPSOU stormwater chemistry data collected at outfalls and within Blacktail Creek between April 2008 and June 2014. These data generally represent current, post-TCRA conditions following the construction of the BPSOU groundwater collection subdrain; additional upgrades to this system; reconstruction of the upper SBC channel; and the first, second, and third cycles of BMP implementation.

The stochastic model is used in this TI evaluation to assess which TEs are practicable and effective to implement at the site and predict whether these measures will be sufficient to meet in-stream ARARs. This is consistent with the TI Guidance, which requires the consideration of feasible and effective cleanup methods before evaluations are made concerning ARAR waivers.

6.2 Hydraulic Inputs to Model

CDM Smith developed a stormwater model for the Butte Hill drainage basins using HydroCAD software in 2009, with the methodology and results detailed in the *Draft Butte Stormwater Modeling Report, Butte Priority Soils Operable Unit* (CDM 2009c). Hydrologic and hydraulic analyses were performed to predict hydrographs, peak flow rates, and maximum runoff volumes for the 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storm events. The modeling is based on the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), Unit Hydrograph Method and the NRCS Curve Number Method for calculating direct runoff from precipitation events over specified drainage areas. The NRCS Technical Release 20 and Technical Release 55 methods for computing rainfall and runoff were used (via the HydroCAD software) to analyze the Butte stormwater system because they are specifically designed for use in urban drainages (NRCS 1986).

For this TI evaluation, the SCS Type I, 5-year, 24-hour design storm was used in the hydrologic model to calculate runoff flow rates using HydroCAD, version 10. This storm event was chosen in consultation with all stakeholders. Smaller storm events are more frequent and likely to have a larger impact on the day-to-day survival of aquatic life than infrequent, larger events. In addition, the probability of achieving DEQ-7 standards during smaller runoff events is greater than during larger volume runoff events because the data have shown that higher flows tend to correlate with

higher concentrations in SBC. However, if necessary, the model can also be used to estimate concentration probabilities during larger design storm events.

To ensure the model appropriately represented the current site conditions within the BPSOU, updates to the 2010 model were undertaken to include:

- Drainage area improvements from the western portion of the lower railroad yard that report to Kaw Avenue
- Inclusion of BPSOU stormwater system improvements carried out post-2010:
  - Anaconda Road Tunnel Lining
  - Buffalo Gulch Tunnel Lining
  - Continental Roadside Channel
  - Kaw Avenue reroute
  - Idaho Street drainage reroute

In addition, any available as-builts were used to correct pipe sizes, inverts, and connections that were found to be in error from previous versions of the model. The work performed to update the HydroCAD model is detailed in a technical memorandum titled *Revised Technical Memo 1: Butte Priority Soils Operable Unit (BPSOU) Existing Conditions HydroCAD Model* (Pioneer 2015a) that is included in Appendix D1.

The HydroCAD stormwater model hydrographs for individual subdrainages were utilized as inputs to the model. The basins draining into upper SBC include Texas, Locust, Warren Avenue, Anaconda Road, Buffalo East, and a combination of smaller drainage areas, including Harrison Avenue (1), Harrison Avenue (2), Philips Avenue, Driggs Street, California Avenue, and Delaware Avenue. The smaller drainage inputs were used to account for composite sheet flows and small outfalls (e.g., parking lots and local streets) reporting to upper SBC above its confluence with Blacktail Creek. Below the SBC/Blacktail Creek confluence, Buffalo Gulch discharges into SBC upstream of station SS-05, with the Montana Street outfall located immediately downstream of station SS-05. The western section of Butte Hill includes the West Side and Idaho Street subbasins, which report to catch basins 8 and 9 at the bottom of Missoula Gulch. Surface waters then discharge to SBC via catch basin 9 outfall. The BTL outfall discharges into SBC at the western end of the BPSOU, immediately upstream of station SS-06G. The last station in SBC before leaving the BPSOU is SS-07. The Metro Wastewater Treatment Plant discharge is located just upstream of SS-07.

This TI evaluation focuses on technologies that could be implemented across the BPSOU, including areas within the upper SBC drainage basin and the eastern and western sides of Butte Hill. Locations where these technologies could be implemented were selected where space permitted and impacts to water quality are most plausible. The modeling focuses on results at station SS-06G to ensure all areas where TEs may be implemented are included and the modeled water quality results are representative of the water just prior to it leaving the OU. Station SS-07

was not chosen because of the influence of the wastewater treatment plant discharge. This is discussed further in Section 7.

The individual outfall hydrographs were obtained from the HydroCAD modeling outputs. Because the stochastic model does not account for routing of hydrographs, the timing of the individual hydrographs was revised to account for lag times and mimic the travel time between individual outfalls. Figures 6-2 and 6-3 show the composite of the shifted hydrographs and the HydroCAD output hydrograph for upper SBC at MSD-3A and station SS-06G, respectively. Overall, the hydrograph-lagging procedure produces comparable results to the simulated hydrograph for upper SBC at MSD-3A in HydroCAD and at SS-06G (see Figures 6-2 and 6-3).

One of the greatest uncertainties in this model is the distribution of rain patterns in the Blacktail Creek watershed and Butte Hill. The watershed contributing to the discharge in Blacktail Creek, immediately upstream of Butte Hill, is approximately 90 square miles and has the potential to contribute large peak flows to SBC. It is difficult to predict the flows in Blacktail Creek when stormwater outfalls from Butte Hill are actively discharging. Several possible scenarios are presented below.

- During spring runoff, flows in Blacktail Creek may be considerably higher than base flow and provide additional dilution for runoff from Butte Hill; therefore, the chemistry would not represent a true thunderstorm-type stormwater chemistry below the confluence of upper SBC and Blacktail Creek.
- A storm may fall on Butte Hill but not within the Blacktail Creek watershed, resulting in near base-flow-like conditions in Blacktail Creek mixing with contaminated stormwater discharge from Butte Hill.
- A storm may fall on the southern portion of the Blacktail Creek watershed independently of a storm that falls on Butte Hill, resulting in two peaks that may or may not coincide.

Depending on actual storm patterns, the timing of peaks from Blacktail Creek and those derived from Butte Hill could differ by hours. To address the multiple scenarios mentioned above, the model was run using both a high (wet weather flow) and low (base flow) flow rate within Blacktail Creek under steady-flow conditions. The results were compared for each simulated technology evaluation. The intent was to bracket the base and wet weather flows in Blacktail Creek to understand the effects of the different flow conditions. For this model and report, the terms “local storm” and “regional storm” were chosen to represent the two flow scenarios. A local storm was assumed to be a storm on Butte Hill that had not yet reached the Blacktail Creek watershed; therefore, Blacktail Creek was running at base flow. A regional storm assumed that a large storm system was impacting both the Butte Hill and Blacktail Creek watersheds simultaneously; therefore, Blacktail Creek was running at a peak storm flow during the time the storm sewer outfalls were discharging from the hill. Local storm conditions in Blacktail Creek were set at 9 cubic feet per second (cfs), and regional storm flow conditions assumed a constant flow of 60 cfs. These flow rates were selected using the flow duration curve for the total record of flow from the USGS gage at SS-04. After discussions between EPA, MDEQ, Butte-Silver Bow County, and Atlantic Richfield, the values 9 and 60 cfs were agreed to be representative of a range

of flows commonly seen at base flow and wet weather events in Blacktail Creek, respectively (see Appendix B for flow duration curve results).

Results indicated the level of dilution has a definite effect on the results of the model but cannot be reliably predicted due to the highly variable nature of rainfall and storm events. In addition, the chemistry in Blacktail Creek during local and regional storm events is very different and is further discussed in the sections below. Finally, input flows from the BTL and Montana Pole Treating Plant were modeled as constant flows of 4 and 0.75 cfs, respectively.

6.3 Water Quality Input to Model

Data presented in the SWCR (EPA and MDEQ 2017) indicate copper is the most problematic COC for stormwater within the BPSOU. As a result, it was decided to focus the model application on total recoverable copper and determine whether a correlation existed between copper and the other mining-related COCs, including cadmium, lead, silver, and zinc. Figure 6-4 shows moderate to strong correlations exist between the relevant COCs, with R^2 values ranging from 0.65 to 0.87. It can therefore be concluded that any TEs that address total recoverable copper will likely also address the other total recoverable mining-related COCs.

Stormwater samples have been regularly collected at the site under a draft interim surface water monitoring plan developed by AR (2013a). Samples were collected utilizing automatic samplers at both in-stream and key outfall locations. In-stream samplers were triggered when water flow at the sample site reached 35 cfs, whereas outfall samplers were triggered at stormwater outfalls when flow was present, considering flow only occurs at outfalls during storm events. Total recoverable copper results for samples collected from 2008 through June 2014 under this program were utilized in the model. This includes stormwater data reviewed and analyzed from 2008 through 2013 as part of the revised SWCR (EPA and MDEQ 2017), data from 2008 through December 2009 provided by AR, and stormwater data from additional outfalls in the upper SBC and within the Buffalo Gulch drainage buried stormwater system collected by EPA in 2009 (CDM 2009a, 2009b). Data from these sampling efforts are discussed briefly in Section 4 and included in the stormwater model, as appropriate.

The total recoverable copper concentrations for each subbasin were input as stochastic variables in the form of PDFs. A statistical evaluation of the data was conducted to determine the stochastic input variables for total recoverable copper. The data were input to the Best Fit program (included with @Risk) to determine the PDF of the data (e.g., lognormal, Weibull, exponential). An example of a PDF for Buffalo Gulch station BG-01 is shown in Figure 6-5. The PDFs for each subbasin in the stochastic model are included in Appendix C1.

Comparisons were made between water quality at sample location MSD-3A and the combined water quality for those outfalls upstream of MSD-3A (Texas, Locust, Warren, East Buffalo, Harrison 1, Harrison 2, Driggs, Philips, California, and Delaware). As seen in Figure 6-6, there is a notable difference between the water quality at sample location MSD-3A and the upstream values obtained for the combined upstream locations. One theory is that upper SBC is acting as a form of BMP, which is positively impacting water quality with the chemistry from individual upstream outfall locations not representative of the combined flows within upper SBC. Another theory is that elevated concentrations occur higher on Butte Hill and are diluted in the downstream

direction. In these cases, the PDF representing station MSD-3A data was used because it represented a composite chemistry of the entire upper SBC drainage and is more representative of the runoff entering SBC.

In addition, statistical analyses were conducted to identify correlations between the various subbasins. The analyses were limited to stormwater chemistry data collected on the same day from two or more subbasin outfalls. The use of correlations in the model assumes that concentrations among the subbasins for a particular storm event will be related. For example, if concentrations at drainage basin "A" were relatively high for a particular storm event, concentrations at drainage basin "B" outfalls would also be proportionately high. This information is used within the model to choose concentrations from the PDFs during the stochastic simulation (see Appendix C2 for the correlation matrix).

Station SS-04 on Blacktail Creek is the upstream boundary within the model, and its location is shown on Figure 6-1. The Blacktail Creek drainage includes most of the valley south and east of Butte Hill, encompassing an area of approximately 90 square miles. Due to the size of the watershed, storm events on Butte Hill are not always concurrent with storm events in the Blacktail Creek drainage; therefore, it is difficult to predict if surface water chemistry encountered during a local or regional storm event should be used in the model. For this reason, both data sets (local storm event and regional storm event) were analyzed, and a different PDF for Blacktail Creek chemistry was used for the two different flow regimes.

Several key assumptions were made regarding water quality data. The first assumption was that stormwater concentrations from outfalls are constant over the duration of the storm during each Monte Carlo iteration. However, water quality variability was captured when the @Risk software runs the thousands of iterations with different COC concentrations. Furthermore, the assumption is conservative because the mechanical samplers at the outfalls (i.e., the input data to the stochastic model) are set to collect the first flush of each storm, which generally is stormwater with the highest metals concentrations. In addition, the model assumes metals concentrations are conservative within the creek for the time and spatial scales of interest; therefore, it is assumed that no degradation, settling, or resuspension occurs. It is also assumed that instantaneous and complete mixing occurs at the point of discharge.

6.4 Model Validation

As with any model, it is necessary to compare predicted results with actual measured data. Measured data at SS-06G were compared with modeled concentrations at SS-06G. Figure 6-7 presents a histogram of the frequencies of concentrations for total recoverable copper measured at station SS-06G since 2008. Because the model output predicts a cumulative distribution of concentration probabilities (rather than a simple histogram), the measured data at SS-06G shown in Figure 6-7 were converted to a cumulative distribution of probabilities. Thus, the cumulative frequency was calculated based on the histograms. Figure 6-7 also compares the modeled output with the cumulative probability distribution of the measured data. The model output represents current conditions for maximum hourly average concentrations and the SCS Type I, 5-year, 24-hour storm event. Two modeled output curves are presented based on the flow regime for Blacktail Creek. The blue curve shows Blacktail Creek input set at 60 cfs using a statistical PDF

based on measured stormwater concentrations at station SS-06G as chemistry input. The red curve shows the prediction based on Blacktail Creek flowing at 9 cfs.

The concentration distributions from the model (the red and blue curves) exceed the cumulative distribution function of the actual stormwater data at SS-06G for total recoverable copper concentrations in all instances. The model therefore over predicts concentration data in relation to the observed data. This is partially a result of using the 5-year, 24-hour design storm when the bulk of the observed data are derived from smaller durations and frequencies but also reflects other uncertainties, including noisy input PDFs, the steady-flow assumption used in Blacktail Creek, water quality inputs as described in Section 6.3, and limitations in the model. Both curves representing the two different flow and chemistry regimes in Blacktail Creek are shown together, with the regional storm event conditions in Blacktail Creek having slightly better agreement than the local storm. In both cases, concentrations were over predicted by a factor of two or more.

6.5 Comparison to Acute Water Quality Standards and Background Concentrations in Blacktail Creek

For the stormwater TI evaluation, modeled concentrations at SS-06G were compared to the acute MDEQ-7 standards and existing water quality conditions at sampling station SS-06G. The acute MDEQ-7 standard for the five contaminants assessed as part of this TI (copper, zinc, lead, silver, and cadmium) for aquatic life are hardness-dependent. Because rainfall contains little or no hardness, the hardness in the receiving stream is diluted during storm events.

The output for each simulation includes the maximum hourly average for copper concentrations at SS-06G. This was calculated to allow an accurate comparison of in-stream water quality conditions at SS-06G and acute aquatic water quality performance standards. Figure 6-8 shows a comparison of model outputs during both a local and regional storm event (9 and 60 cfs, respectively, in Blacktail Creek). The concentration predictions show higher concentrations of copper occur in surface waters during a local storm event. A lower flow rate in Blacktail Creek during a local storm event results in less dilution and higher metals concentrations. Conversely, higher flow in Blacktail Creek results in greater dilution. The presentation of model outputs is limited to station SS-06G. This simplifies the presentation of the data in an already complex evaluation. Concentrations of other mining-related COCs were also calculated using the correlation equations and showed a similar result during both local and regional storm events.

For comparison against the modeling results, a hardness-based standard was calculated for each iteration of the model at SS-06G, and the modeled concentration at SS-06G was compared to it. No correlation was found to exist between hardness and metals concentrations at station SS-06G. Hardness was calculated by creating a stochastic variable (in the form of a PDF) using hardness values from the wet weather data. The PDF value was then inserted into the individual hardness-based formulas identified in the MDEQ-7 standards to calculate the acute standard for that hardness value. This allowed each iteration of the model to compare a calculated COC concentration with a calculated, hardness-based acute water quality performance standard, allowing for exceedance rates to be estimated for water quality at SS-06G.

6.6 Modeling Potential Stormwater Technologies Elements

After the existing conditions model was validated against current stormwater chemistry at SS-06G, additional features were added to the model to allow for the evaluation of several potential TEs. The results of these technology evaluations are presented in Section 7.

The original HydroCAD model was revised to include potential TEs for TEs that included routing of drainage basin flows through stormwater basins and/or structures. The new outlet hydrographs were directly inserted into the stochastic model. The catch basin configurations and outlet structures were added to the HydroCAD model as shown in the preliminary designs provided by AR in the technology evaluations included in Appendices D1 through D3. Further detail regarding the effectiveness of several other TEs that were not provided by AR were calculated and are presented in Appendix D4. Modifications to the designs may occur during the final design process as locations and configurations are solidified.

To allow the model to evaluate potential changes to water quality following the implementation of the various BMP technologies, a multiplier was applied to each of the flow or chemistry inputs in individual subbasins where TEs are evaluated. For example, when this multiplier was equal to 1.0, the model represented no change in flow and concentration within that particular subbasin. However, to account for contaminant removal within a TE, the water chemistry input is revised. For example, if the water chemistry was multiplied by a factor of 0.7, this would translate to a decrease in concentrations by 30 percent. Further, for flow diversion TEs, the hydrographs were adjusted with the multiplier. For example, if flow was multiplied by a factor of 0.5, all flows in the flow hydrograph for that input were decreased by 50 percent. Setting the multipliers to zero, effectively turns the particular input “off.”

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Section 7

Evaluation of Remedial Actions and Restoration Potential

The CSM in Section 5 identified several sources of contamination that have the potential to contribute to surface water contamination within the BPSOU. These known sources vary, depending on flow regime, and include:

- Base flow and normal high flow conditions: Mine waste (waste rock and tailings) via groundwater input; metals-laden sediment deposits along the bed, banks, and adjacent floodplain; and upstream sources outside of the BPSOU
- Wet weather flow conditions: Mine waste (waste rock and tailings) via runoff and groundwater input and upstream sources outside of the BPSOU

The data analysis in Section 4 evaluates water quality within the BPSOU at specific flow regimes, and correspondingly, this section has been divided into two parts: (1) base flow and normal high flow and (2) wet weather flow. An evaluation of TEs for reduction of in-stream COC concentrations has been undertaken for each flow regime to determine whether current water quality performance standards within the BPSOU can be achieved. This section also describes the results of the evaluation of potential TEs, using the stochastic model described in Section 6.

7.1 Evaluation of Base Flow and Normal High Flow Remedial Technologies

The BPSOU ROD (EPA 2006) identified three primary actions for surface water at non-storm flow: additional groundwater control, sediment and soil removal, and flow augmentation. To date, groundwater contributions have not been quantifiable via traditional measurement techniques (i.e., velocity-area measurement, dye tracer, or thermal imagery) nor were exceedances observed during 2011through 2013 outside of SS-07 at base flow. Consequently, groundwater control is not evaluated in this document. It should be recognized that water-quality still degrades through BPSOU under such flow conditions. Additionally, due to developments at the Butte Mine Flooding OU, flow augmentation is not possible as all available water is now used by the local mine; thus, this technology will not be evaluated either. As a consequence, the remaining sections of this document emphasize remediation sources of contaminants that cause exceedances of performance standards in surface water during normal high flow, primarily bed and bank sediment metals. Sediment and soil removal will be evaluated as part of the TI and are discussed in detail below.

The CSM in Section 5 identifies contaminated pore water as a contributor to metals contamination in surface water during base flow conditions and suspended sediments as a contributor to total recoverable metals contamination in surface water during normal high flow conditions (Figure 5-1). The source of the suspended sediments was identified as bed and bank sediments as well as suspended sediments entering the site from upstream. Section 4 indicated

that base flow exceedances of COCs were limited to SS-07; therefore, evaluation of sediment removal is unnecessary for this flow regime. The SWCR (EPA and MDEQ 2017) identified contaminated bank sediment sources along Blacktail Creek adjacent to the Blacktail Berm and Visitor's Center in the vicinity of the pre-1895 confluence of SBC and Blacktail Creek. Additional historic tailings were identified in the BRW vicinity. Major removal and stabilization actions in 1997 (LAO ERA) and 2010 through 2011 (Golden Triangle) addressed much of the contaminated bank and adjacent floodplain sediment downstream of SS-04 where the stream crosses under George Street; however, contaminated sediments still exist at other locations both up and downstream of this station.

Bed sediment sampling undertaken from 2010 through 2011, supplemented by Streamside Tailings Operable Unit (SSTOU) quarterly bed sediment monitoring from 2008 through 2013, identified contaminated bed sediment in areas adjacent to the Blacktail Berm and Visitor's Center and downstream through slag canyon (EPA and MDEQ 2017). Metals concentrations reported in these bed sediments were significantly higher than upstream of Grove Gulch, indicating potential background conditions upstream of that location.

Groundwater sources of metals affecting surface water are evaluated in the SWCR (EPA and MDEQ 2017). Copper and zinc are both elevated in shallow groundwater. As zinc does not exceed performance standards during base (see Section 6 of SWCR) and normal high flow (see Section 8 of SWCR) and copper exceeds performance standards only during normal high flow (see Section 6 and Section 8 of the SWCR), additional control of groundwater is not a TE within this TI evaluation. It is assumed that groundwater loading is most influential during base flow conditions when the exceedance rates are already within standards. In addition, contamination of bed and bank sediments by groundwater/pore water was not evaluated as a TE because it has not been confirmed as a process or quantified at this time.

The SWCR (EPA and MDEQ 2017) identified the Metro STP as the largest source of copper loading to surface water during normal high flow and base flow conditions. Based on the evaluations in the SWCR, exceedances of the chronic aquatic life performance standard for copper occur at station SS-07 at a much greater rate than the rest of the site. The Metro STP is a permitted facility under the MPDES. There is no current effluent limitation on metals, but under existing regulations, the effluent must meet performance standards in the future for cadmium, copper, mercury, and zinc specified in the permit (MDEQ 2012). As a permitted facility under a different program, it is assumed that the requirement will be met within the time frame specified by the permit. Evaluation of this action will be conducted by calculating the in-stream copper concentrations based on the assumption that loading from the effluent meets permit discharge requirements.

7.1.1 Normal High Flow Technology Element: Sediment and Stream Bank Removal Action (Secondary Pathway Control)

The BPSOU ROD (EPA 2006) required the surface water remedy to include sediment control as follows:

> *"Excavation and removal to a repository of contaminated sediments from the stream bed, banks, and adjacent floodplain along Blacktail Creek and Silver Bow*

> *Creek, from just above the confluence of Blacktail Creek and Metro Storm Drain to the beginning of the reconstructed Silver Bow Creek floodplain at Lower Area One."* (p. 12-9 EPA and MDEQ 2006)

This action has not yet been completed. As indicated in Section 5, sediments from the storm drains are contaminated with metals and are a contributing source of sediment to SBC. This sediment should be controlled prior to in-stream bed sediment removal or recontamination will occur.

Bank and adjacent floodplain sediment can be addressed by removal per the terms of the ROD. Previous bank sediment actions at the site (LAO ERA and Golden Triangle Removal) have involved removal and replacement with clean materials. The LAO ERA involved complete stream removal and reconstruction; thus, it included bed sediment removal. Any other remedy, such as addition of a barrier without removal, may reduce the size of the channel and affect the hydraulics of the stream. Additionally, these contaminants could become mobilized at a later date. Therefore, it is assumed that removal of contaminated sediment is necessary. The banks and adjacent floodplains will be replaced with clean material.

The TE for sediment removal expands on the 2004 FS scope by adding bank sediment removal from George Street (the upstream end of the Golden Triangle action) to Grove Gulch. Since some bank removal work was already completed during the Golden Triangle action, the work to complete this TE is similar to that described in the 2004 FS.

7.1.1.1 Sediment Removal

Two sources are included in this TE: bank/floodplain sediment removal and bed sediment removal. Bank/floodplain sediment removal includes the removal and replacement of wastes from surface water and the adjacent floodplain. Bank/floodplain sediment is a significant source. Its removal is expected to be effective in reducing COC loading to surface water and to mitigate future mobilization and transport of contaminated bank/floodplain material. Removal would be conducted in a dry or dewatered condition along with confirmation sampling. Replacement would be conducted using materials low in metals (soil) or largely inert. The source of the bank/floodplain contamination is primarily historic deposition of tailings as described in the SWCR (EPA and MDEQ 2017). Because the conditions that caused bank contamination no longer exist, the potential for recontamination is relatively small. Thus, the bank/floodplain removal should result in permanent reduction in loading to surface water from this source.

Bed sediment, conversely, is transient with sources that include transport of sediment from upstream, erosion of contaminated banks, and discharge from stormwater outlets. Additionally, literature shows that groundwater loading to bed sediments can occur, this source too should be considered prior to sediment removal to prevent recontamination (and may necessitate additional hydraulic control). Bed sediment removal could be conducted by temporarily relocating the entire stream reach during construction, dewatering the stream bed, and then excavating in dry conditions similar to bank removal. This method was used during the LAO ERA. Having open access to dewatered sediment would allow for effective removal. Bed sediment could also be removed underwater by dredging, a practice common in deep water environments. Considering this only allows for partial access to the sediment bed, it is considered less effective than the stream reach relocation option. Alternatively, a hybrid approach could also be conducted

by simply isolating the surface water into half of the channel and removing the bed sediment in a partially dewatered environment such as the process used when the culverts and associated sediment were removed at the downstream end of slag canyon in 2010. The 2004 FS was not specific about the removal methods; therefore, this TI assumes that the hybrid method would only be used for ease of implementability on relatively short sections since it is not expected to be as effective as dry removal.

Post-removal bed sediment recontamination is dependent on the effectiveness of source control. Source control will include bank and adjacent floodplain removal and application of BMPs (e.g., TE9 – Bioretention Basins) to control sediment in stormwater. The bank removal is expected to prevent recontamination from banks. The upstream sediment is much less contaminated than the contaminated bed sediment and stream banks targeted in this TE; therefore, sediment deposited from upstream would be expected to result in concentrations of metals in the bed sediments that are less than in the current conditions. The primary source of recontamination to bed sediments is from the stormwater system or potentially from groundwater loading to sediments; therefore, it is assumed bed sediment removal would occur after sources of recontamination have been controlled (Association of State and Territorial Solid Waste Management Officials 2013). Groundwater recontamination of sediments is a potential outcome that cannot currently be confirmed as a process or quantified without additional studies.

Based on Section 7.2 of this TI evaluation, one of the TEs for controlling contaminated stormwater includes bioretention basins. These basins are expected to be effective at removal of sediment up to the design capacity of the basin. Under conditions causing an exceedance of basin capacity, partially treated stormwater containing suspended sediment will be discharged to surface water, which is likely to cause some recontamination. Based on the design storm for which the basins were evaluated (5-year, 24-hour event), recontamination may occur once per 5 years on average with this alternative remedial strategy. During the period between recontamination events, the sediment would mix with less contaminated sediment from upstream, thus, resulting in lower metals concentrations than current conditions. Although recontamination reduces the effectiveness of the bed sediment removal, for the purposes of this TI, the resulting effectiveness is a notable overall improvement on current conditions.

7.1.1.2 Estimated Removal Effectiveness

For the purposes of this TI, a removal effectiveness is required that must consider the potential for recontamination. The National Research Council (2007) indicates that sediment removal by dredging can result in removal effectiveness up to approximately 95 percent of the contaminant mass. Leaving some contaminant mass in place or recontamination would result in some continued loading to surface water.

To estimate the effectiveness of previous bed and bank and adjacent floodplain removal actions at BPSOU, USGS data bracketing the dates of removal actions were analyzed to evaluate changes resulting from these major actions and from unrelated activities, including upstream of SS-01. The major action of this type was the LAO ERA. According to the BPSOU ROD, the majority of the removal action occurred through the summer and fall of 1997. Another action that could have had significant effect on sediment and surface water quality was the Stormwater TCRA. Much of that

work was conducted from 1997 through 2000. USGS data from stations SS-01 (USGS station 12323230) and SS-07 (USGS station 12323250) were available beginning in 1993.

USGS compiled geometric mean flow-adjusted concentrations of arsenic, copper, zinc, specific conductance, and suspended sediment at 5-year intervals for the water year periods of 1996 through 2010 (Sando et al. 2014) at stations SS-01 and SS-07. The flow-adjusted concentrations are intended to remove streamflow-related variability in concentrations, and the geometric mean is used to establish a single value to represent the central tendency in the flow-adjusted concentrations (Sando et al. 2014).

Table 7-1 presents the USGS geometric mean flow-adjusted concentrations of total recoverable arsenic, copper, and zinc and suspended sediment prior to (represented by the start of water year 1996), shortly after (represented by the start of water year 2001), and somewhat after (represented by the start of water year 2006) the LAO ERA. Increases in concentrations from SS-01 to SS-07 were recorded for arsenic, copper, and suspended sediment during all time periods. In particular, the total recoverable copper concentrations increased 34-fold between SS-01 and SS-07 at the start of water year 1996 (prior to the LAO ERA). Shortly after the LAO ERA (start of water year 2001), the copper concentration increased 9-fold between SS-01 and SS-07. Somewhat after the LAO ERA (start of water year 2006), the copper concentration increased 6-fold between SS-01 and SS-07.

Table 7-1 Flow-Adjusted Metals Concentrations Upstream and Downstream of LAO

Constituent	Start of Water Year 1996			Start of Water Year 2001			Start of Water Year 2006		
	SS-01	SS-07	Station to Station Increase	SS-01	SS-07	Station to Station Increase	SS-01	SS-07	Station to Station Increase
Total Recoverable Arsenic (µg/L)	3.8	13	9.2	2.8	10	7.2	3.1	5.6	2.5
Total Recoverable Copper (µg/L)	5.2	180	175	4.3	44	39.7	4.3	31	26.7
Total Recoverable Zinc (µg/L)	Not Reported	1100	Insufficient Data	Not Reported	350	Insufficient Data	Not Reported	98	Insufficient Data
Suspended Sediment (mg/L)	6.7	15	8.3	7.2	14	6.8	5.6	7.5	1.9

Source: Sando et al. 2014, Table 4.

Concentrations were relatively unchanged between periods at SS-01; thus, changes in concentrations at SS-07 reflect improvements following remedial actions at BPSOU. Table 7-2 shows changes in concentrations during (1996 through 2000) and after (2001 through 2005) the LAO ERA as reported by Sando et al. (2014). For the period 1996 through 2000 during and shortly after the LAO ERA, reductions ranged from 9 percent for suspended sediment to 76 percent for copper. For the total period from 1996 through 2005, reductions ranged from 51 percent for suspended sediment to 90 percent for zinc. A small portion of the later period

samples were collected after the BPSOU subdrain water was diverted to BTL (2005); thus, the reduction associated with the LAO ERA would be slightly less.

Table 7-2 Change in Flow-Adjusted Metals Concentrations Downstream of LAO at Station SS-07

Constituent	Geometric Mean Decrease		Total Decrease from 1996 through 2005 (estimated)
	1996 through 2000	2001 through 2005	
Total Recoverable Arsenic	26%	44%	59%
Total Recoverable Cadmium	58%	64%	85%
Total Recoverable Copper	76%	29%	83%
Total Recoverable Iron	55%	17%	63%
Total Recoverable Lead	66%	50%	83%
Total Recoverable Zinc	66%	72%	90%
Suspended Sediment	9%	46%	51%

Source: Sando et al. 2014, Table 4-1.

Based on the trend analysis summarized in Table 7-2, remedial actions, including the LAO ERA and to a lesser extent other actions at BPSOU between 1996 and 2000, resulted in approximately a 76 percent reduction in total recoverable copper. Expanding that period through 2005, a reduction of 83 percent was realized. Furthermore, Sando et al. (2014) calculated an 80 percent reduction in total recoverable copper load and a 60 percent decrease in arsenic and sediment loads from 1996 through 2010. Overall, it can be estimated that the LAO removal action was approximately 80 percent effective at reducing copper concentrations and loads.

Considering this, the bank and bed sediment removal is assumed to be effective at removing 80 percent of the reach load after recontamination has occurred. Uncertainty of this assumption will be evaluated below by calculating exceedances based on 10, 25, 50, and 90 percent removal effectiveness.

7.1.1.3 Reach Loading

Based on the loading analysis in the SWCR (EPA and MDEQ 2017), the second largest source of total recoverable copper loading during normal high flow conditions occurs in the reach between SS-05 and SS-05A (slag canyon). The reach upstream of SS-04 (Blacktail Berm/Visitor's Center) is the fourth largest source. These reaches are also sources of loading for other COCs, but copper has the most exceedances of the chronic performance standard. Arsenic, iron, and lead have some exceedances and will be evaluated along with copper. The largest load, the Metro STP, is not considered part of this TE. The third largest load, SS-01, is the upstream compliance station where Blacktail Creek enters the site.

Data presented in the SWCR (EPA and MDEQ 2017) showed a single exceedance for copper occurred throughout 20 high normal and 10 base flow events at both SS-04 and SS-06A, respectively, from May 2011 through 2013. These exceedances reflect conditions following the completion and stabilization of the BRW extension and the Golden Triangle removal action. More exceedances of the copper chronic performance standard occurred at SS-07 due to loading from the Metro STP, which as previously stated is not addressed by this TE. Although base flow exceedances for copper (and lead) are limited, base flow is included in the summation of exceedances.

Reach loading between stations SS-01 and SS-5A was calculated for each normal high flow event from 2011 through 2013, and the median loads are presented in Table 7-3. The difference in loading from stations SS-01 to SS-05A has a median of 0.41 lb/day and a geometric mean of 0.40 lb/day. The reach load for each normal high flow event was reduced by the assumed 80 percent effectiveness of the TE. The median of these reductions is 0.33 lb/day, and the geometric mean of these reductions is 0.32 lb/day. This reduction is subtracted from loads at downstream stations, and a new load and concentration is calculated for each event. The mean of the new load and concentrations are presented in Table 7-3.

Table 7-3 Load Reduction and Predicted Copper Concentrations following Sediment Removal based on 2011 through 2013 Data

Station	Base Line Median Total Recoverable Copper (µg/L)	Base Line Median Total Recoverable Copper Load (lb/day)	Median Load Removed (lb/day)	Predicted Median Total Recoverable Copper Load (lb/day)	Predicted Median Total Recoverable Copper (µg/L)
SS-01	3.6	0.26	--	0.26	3.6
SS-05A	7.1	1.0	0.33	0.31	3.5
SS-06A	7.4	0.60	0.33	0.40	4.3
SS-06G	6.9	0.73	0.33	0.49	4.5
SS-07	12.0	1.5	0.33	1.2	9.0

Note: Load calculations were conducted on underlying data, not median values presented herein.

The new concentration is then compared to the performance standard for each event, and the number of predicted exceedances are summed. The same analysis is conducted for base flow, but because few exceedances occurred from 2011 through 2013 and the loads between SS-01 and SS-05A were relatively low, a load reduction predicted few exceedances. Only the resulting exceedances at base flow are presented. This analysis assumes that all copper loading in this reach during normal high flow conditions would be reduced by 80 percent following implementation of the sediment removal TE.

The baseline concentrations, loading reduction, and predicted concentrations for total recoverable copper following sediment removal are presented in Table 7-4. Table 7-4 shows the baseline total recoverable copper concentrations from 2011 through 2013 at the following five stations: SS-01, SS-05A, SS-06, SS-06G, and SS-07. One event was missing the discharge value, making it unsuitable for loading calculations; therefore, the median baseline concentrations are not identical to those presented in Table 7-3. Stations SS-04 and SS-05 were omitted from Tables 7-4 through 7-7 because the basis of the calculations, the total load reduction between SS-01 and SS-05A, was already subtracted. Further parsing at SS-04 and SS-05 was not conducted. Although the reach load between SS-01 and SS-05A was calculated and subtracted for each high flow event, Table 7-4 only shows the median of these data. The predicted concentration following load subtraction is presented along with the number of exceedances from 2011 through 2013. Finally, the predicted exceedances at base flow are shown in Table 7-4. Adding the predicted normal high flow exceedances with the predicted base flow exceedances provides the total number of exceedances of the chronic performance standard over a period of nearly 3 years.

Table 7-4 Predicted Chronic Copper Criteria Exceedances following Sediment Removal based on 2011 through 2013 Data

	Normal High Flow Conditions				Base Flow	Both Conditions
Station	Base Line Median Total Recoverable Copper (µg/L)	Baseline Exceedances per 3 years	Predicted Median Total Recoverable Copper (µg/L)	Predicted Exceedances per 3 Years	Predicted Exceedances per 3 Years	Total Chronic Exceedances per 3 Years
SS-01	3.6	1	3.8	1	0	1
SS-05A	7.1	2	3.5	1	0	1
SS-06A	7.4	3	4.8	0	1	1
SS-06G	6.9	1	4.8	0	0	0
SS-07	12.0	6	9.1	4	3	8

The three stations downstream of slag canyon (SS-05A, SS-06A, and SS-6G) have zero to one predicted exceedances per 3 years based on load reductions due to sediment removal. Given that DEQ-7 specifies that one exceedance per 3 years on average is allowable, these stations are generally predicted to meet the chronic performance standard at base and normal high flow conditions with bank and bed sediment removals. It is important to note that the upstream station (SS-01) also has an exceedance. The influence of upstream conditions is explored in Section 7.1.1.6. The eight exceedances predicted every 3 years for station SS-07 reflect the Metro STP as a loading source of copper, which is not addressed in this TE.

The baseline concentration, loading reduction, and predicted exceedances for total recoverable arsenic following sediment removal are presented in Table 7-5. The sediment removal did not significantly change the number of exceedances. This is consistent with the SWCR, which indicated that the primary source of arsenic at normal high flow conditions is upstream of SS-01. Since the applicable arsenic performance standard is a human health standard, no exceedances are allowable.

Table 7-5 Load Reduction and Predicted Arsenic Concentrations following Sediment Removal based on 2011 through 2013 Data

	Normal High Flow Conditions					Base Flow
Station	Base Line Median Total Recoverable Arsenic (µg/L)	Baseline Exceedances per 3 Years	Median Load Removed (lb/day)	Predicted Median Total Recoverable Arsenic (µg/L)	Predicted Exceedances per 3 Years	Predicted Exceedances per 3 Years
SS-01	4.4	3	--	4.4	3	0
SS-05A	5.5	3	0.18	4.2	3	0
SS-06A	5.0	3	0.18	3.9	3	0
SS-06G	5.3	3	0.18	3.6	2	0
SS-07	4.1	2	0.18	3.1	2	0

The baseline concentration, loading reduction, and predicted exceedances for total recoverable iron following sediment removal are presented in Table 7-6. The sediment control TE resulted in

one fewer exceedance at SS-05A but did not reduce the rate to the allowable one per 3 years. Similar to arsenic, the SWCR indicated that the source of iron at normal high flow conditions is upstream of station SS-01.

Table 7-6 Load Reduction and Predicted Iron Concentrations following Sediment Removal based on 2011 through 2013 Data

Station	Normal High Flow Conditions					Base Flow
	Base Line Median Total Recoverable Iron (µg/L)	Baseline Exceedances per 3 Years	Load Removed (lb/day)	Predicted Median Total Recoverable Iron (µg/L)	Predicted Exceedances per 3 Years	Predicted Exceedances per 3 Years
SS-01	640	5	--	640	5	0
SS-05A	700	5	12.2	475	3	0
SS-06A	630	3	12.2	591	3	0
SS-06G	480	2	12.2	388	2	0
SS-07	320	2	12.2	301	2	0

The baseline concentration, loading reduction, and predicted exceedances for total recoverable lead following sediment removal are presented in Table 7-7. The baseline exceedance rate was low, and implementation of the sediment removal TE is predicted to reduce the number of exceedances to zero at normal high flow conditions. The single exceedance at base flow involved an anomalously high concentration and may not be representative of conditions at other times.

Table 7-7 Load Reduction and Predicted Lead Concentrations following Sediment Removal based on 2011 through 2013 Data

Station	Normal High Flow Conditions					Base Flow
	Base Line Median Total Recoverable Lead (µg/L)	Baseline Exceedances per 3 Years	Load Removed (lb/day)	Predicted Median Total Recoverable Lead (µg/L)	Predicted Exceedances per 3 Years	Predicted Exceedances per 3 Years
SS-01	0.51	0	--	0.51	0	0
SS-05A	1.7	2	0.085	0.70	0	0
SS-06A	1.8	0	0.085	0.93	0	1
SS-06G	1.7	0	0.085	0.79	0	0
SS-07	1.4	1	0.085	0.96	0	0

7.1.1.4 Time Frame

Because sediment removal is essentially an instantaneous action and improvements to surface water are expected to occur during the next normal high flow condition event, evidence of the reduction in loading is expected to occur within a short period. As described in Section 7.1.1.1, although a recontamination event is estimated to occur once every 5 years, on average, the deposition of clean sediments in between recontamination events is anticipated to result in cleaner sediments overall. Therefore, the time frame to realize the results of this TE is short.

7.1.1.5 Uncertainty

The predicted reductions in loading, resulting concentrations, and number of exceedances are subject to several sources of uncertainty, the largest of which is the effectiveness. As discussed in Section 7.1.1.2, an effectiveness of 80 percent load reduction for copper is used for this analysis. The reference to the National Research Council (2007) described in that section indicated high rates of COC mass removal is possible from dredging, but the actual results measured in various ways, such as biotic population recovery, indicated much less success at a variety of dredge sites. The translation from mass removal in sediment to total recoverable concentrations in surface water might not be a direct relationship. The estimated value derived from the USGS (Sando et al. 2015) data used on-site data to gage effectiveness based on previous removal events. However, stormwater TEs have yet to be implemented in the BPSOU, and the actual effectiveness could vary widely from the estimated effectiveness of the site removal events.

The total uncertainty in the effectiveness calculation is evaluated below using a basic sensitivity analysis applying different effectiveness values and recalculating the number of exceedances. For copper, effectiveness values of 10, 25, 50, and 90 percent are included. A summary of the resulting exceedances is presented in Table 7-8. Generally, an effectiveness of 50 percent or higher results in an acceptable number of exceedances per 3 years, except at SS-07. Even an effectiveness of only 25 percent predicts an acceptable exceedance rate at SS-05A and SS-06G. To address base flow, one exceedance at SS-06A occurred due to an anomalously high sample concentration that was not changed by the load reduction. Five additional base flow exceedances occurred at SS-07 that were not changed by the load reduction at 10 and 25 percent but were reduced to 5 exceedances at 50 percent and 4 exceedances at 80 and 90 percent effectiveness.

Table 7-8 Predicted Chronic Copper Exceedances per 3 Years at Various Effectiveness Values for Normal High Flow 2011 through 2013

Station	Baseline (Table 7-2)	10% Effectiveness	25% Effectiveness	50% Effectiveness	80% Effectiveness (Table 7-2)	90% Effectiveness
SS-01	1	1	1	1	1	1
SS-05A	2	2	1	1	1	0
SS-06A	3	3	3	1	0	0
SS-06G	1	1	1	1	0	0
SS-07	6	6	4	4	4	3

7.1.1.6 Upstream Allowance

For surface water at BPSOU, reference (outside of the BPSOU) is considered to be the conditions at station SS-01. Tables 7-4 through 7-6 indicated that the chronic or human health performance standard was exceeded regularly for copper, arsenic, and iron; however, the cause of the exceedance (i.e., from BPSOU sources or from upstream conditions) has not been discussed. The BPSOU ROD allows for the use of upstream contaminant input in determining whether compliance with in-stream ARAR standards is achieved. This section evaluates whether the exceedances at the downstream stations are largely attributable to background, which would prevent attainment of the performance standard through the site. If the upstream sample concentration is greater than both the ARAR and the concentration in downstream sample, then

background conditions are contributing to the downstream exceedance. If the upstream sample is greater than the ARAR, but the downstream sample has a higher concentration, then both background and the site are contributing to the downstream exceedance.

For copper, only one upstream exceedance was identified for the 2011 through 2013 period, which occurred on June 28, 2011. The baseline copper concentrations for this exceedance are presented in Table 7-9. All stations had copper concentrations that exceeded the performance standard, and all downstream stations were higher than the upstream station. After application of the sediment removal TE for this date with an 80 percent effectiveness, predicted concentrations remain elevated above the chronic performance standard at two of the four downstream stations. As a result, it is predicted that the downstream exceedances are caused primarily by background concentrations.

Table 7-9 Upstream Influence on Predicted Chronic Copper Exceedances for a Normal High Flow Event on June 28, 2011

Station	Actual Copper Concentrations (µg/L)	Standard	Exceedance	Predicted Copper Concentrations (µg/L)	Chronic Performance Standard	Exceedance
SS-01 (upstream)	8.6	8.0	yes	8.6	8.0	yes
SS-05A	13	8.8	yes	9.0	8.8	yes
SS-06A	12	8.6	yes	8.4	8.6	no
SS-06G	13	10.5	yes	9.2	10.5	no
SS-07	18	10.3	yes	14.8	10.3	yes

Three events with exceedances of the arsenic human health standards were recorded at normal high flow during 2011. Data from these events are presented in Table 7-10 as three lines per station. For all downstream stations, the arsenic concentrations were near the concentration at SS-01. This indicates that the background conditions are contributing to exceedances at the site. Load removal associated with the sediment removal TE changed the predicted downstream concentration by a small amount, but the exceedance rate was nearly unchanged for two of the events. Even if the effectiveness was increased to 90 percent, the same number of exceedances occurs. Therefore, the primary cause of exceedances of the human health standard for arsenic at the site appears to be upstream or background conditions.

Similar to arsenic, three events with exceedances of the iron chronic aquatic life standard were recorded at normal high flow during 2011 at both the upstream station and downstream stations and only one event with an exceedance at the upstream station. Data from these events are presented in Table 7-11 as four lines per station. For all downstream stations, the iron concentrations were equal to or less than at SS-01. This indicates that the background conditions are contributing to exceedances at the site. After load reduction from the sediment TE, there were fewer exceedances at the downstream stations predicted than at the upstream station. Therefore, the primary cause of exceedances of the chronic aquatic life performance standard for iron following sediment removal at the site is expected to be upstream or background conditions, with some contribution from on-site sources.

Table 7-10 Upstream Influence on Predicted Human Health Arsenic Exceedances for Normal High Flow Events on June 28, July 6, and July 19, 2011

Station	Date	Actual Arsenic Concentrations (µg/L)	Performance Standard	Exceedance	Predicted Arsenic Concentrations (µg/L)	Performance Standard	Exceedance
SS-01	6/28/2011	16	10	yes	16	10	yes
	7/6/2011	17	10	yes	17	10	yes
	7/19/2011	12	10	yes	12	10	yes
SS-05A	6/28/2011	17	10	yes	15	10	yes
	7/6/2011	17	10	yes	16	10	yes
	7/19/2011	12	10	yes	10	10	no
SS-06A	6/28/2011	16	10	yes	14	10	yes
	7/6/2011	18	10	yes	17	10	yes
	7/19/2011	12	10	yes	10	10	no
SS-06G	6/28/2011	16	10	yes	15	10	yes
	7/6/2011	16	10	yes	15	10	yes
	7/19/2011	11	10	yes	10	10	no
SS-07	6/28/2011	15	10	yes	14	10	yes
	7/6/2011	14	10	yes	13	10	yes
	7/19/2011	9.8	10	no	8.6	10	no

Table 7-11 Upstream Influence on Predicted Chronic Aquatic Iron Exceedances for Normal High Flow Events on June 28, July 6, and July 19, 2011, and April 18, 2012

Station	Date	Actual Iron Concentrations (µg/L)	Performance Standard	Exceedance	Predicted Iron Concentrations (µg/L)	Performance Standard	Exceedance
SS-01	6/28/11	1700	1000	yes	1700	1000	yes
	7/6/11	1800	1000	yes	1800	1000	yes
	7/19/11	1200	1000	yes	1200	1000	yes
	4/18/12	1200	1000	yes	1200	1000	yes
SS-05A	6/28/11	1700	1000	yes	1600	1000	yes
	7/6/11	1500	1000	yes	1500	1000	yes
	7/19/11	1100	1000	yes	1000	1000	no
	4/18/12	850	1000	no	850	1000	no
SS-06A	6/28/11	1500	1000	yes	1500	1000	yes
	7/6/11	1600	1000	yes	1600	1000	yes
	7/19/11	1500	1000	yes	1400	1000	yes
	4/18/12	830	1000	no	1000	1000	no
SS-06G	6/28/11	1500	1000	yes	1500	1000	yes
	7/6/11	1400	1000	yes	1500	1000	yes
	7/19/11	1000	1000	no	930	1000	yes
	4/18/12	930	1000	no	930	1000	no
SS-07	6/28/11	1500	1000	yes	1400	1000	yes
	7/6/11	1200	1000	yes	1300	1000	yes
	7/19/11	770	1000	no	710	1000	no

Station	Date	Actual Iron Concentrations (µg/L)	Performance Standard	Exceedance	Predicted Iron Concentrations (µg/L)	Performance Standard	Exceedance
	4/18/12	760	1000	no	760	1000	no

None of the samples at the upstream station exceeded the chronic aquatic life performance standard for lead, and no downstream exceedances were predicted following implementation of the sediment removal TE. Therefore, upstream or background is not a significant influence for lead.

7.1.2 Metro Sewage Treatment Plant Effluent Limits

The TE for the Metro STP affects only the reach from SS-06G to SS-07. Since it would not affect upstream exceedances, the sediment removal TE is considered a minimum action and the STP TE is added to the sediment TE. Based on the MPDES permit, the Metro STP will need to meet an effluent limit of 14 µg/L total recoverable copper on a daily average basis or 12.8 µg/L copper on a monthly average basis, beginning in 2017 (MDEQ 2012). The chronic aquatic life standard is based on a 4-day average; therefore, the daily average will be used. Using the 2011 through 2013 data for base and normal high flow conditions with the sediment TE reductions implemented, the predicted load entering the surface water reach between stations SS-06G and SS-07 was calculated. This is a short reach, and its entire load increase is attributable to the STP effluent. Using the instantaneous flow difference between these stations, the median added discharge was 6.0 cfs, whereas the added copper load was 0.68 lb/day. Effluent data presented in the SWCR indicated a median daily discharge of 5.9 cfs and a median copper load of 1.0 lb/day for base flow and normal high flow conditions from 2011 through 2013. The effluent data confirm that the in-stream differential data are representative of discharge from the STP but seem to underestimate copper loading. Given that the effluent data are based on 8 samples while the differential in-stream data are based on 19 samples, it is likely that the difference is within the range of uncertainty.

Using the difference in instantaneous discharge between stations and the daily average effluent limit of 14 µg/L, the future load was calculated for each main stem sampling event. When the actual load was greater than the allowable load, the excess load above the limit was subtracted, and a new concentration at SS-07 was calculated and compared to the copper performance standard. It should be noted that the actual load exceeded the allowable load for nearly every sampling event from 2011 through 2013.

The results of the loading calculations are shown in Table 7-12 as median copper concentrations and loads along with the predicted number of exceedances for the 2011 through 2013 period. These two actions combined (sediment removal and STP improvements) result in a significant reduction in the number of exceedances to one per 3 years. The Metro STP is not a major contributor of loading from other metals.

Table 7-12 Load Reduction and Predicted Copper Concentrations at SS-07 Following Sediment Removal and New STP Effluent Limits based on 2011 through 2013 Data

Flow Condition	Base Line Median Total Recoverable Copper (µg/L)	Baseline Exceedances	Load removed (lb/day)	Predicted Median Total Recoverable Copper (µg/L)	Predicted Exceedances	Total Chronic Exceedances per 3 Years
Normal High Flow	12	6	0.55	7.1	1	1
Base Flow	13	5	0.36	8.2	0	

7.1.3 Base Flow and Normal High Flow Summary

The evaluated TEs that address exceedances of the chronic aquatic life performance standards during base flow and normal high flow conditions included:

- The removal of bed, bank, and adjacent floodplain sediments for the entire reach of Blacktail and SBC within the OU
- Meeting future effluent performance standards at the Metro STP

As one exceedance per 3 years is allowable per DEQ-7 and the uncertainty is thought to be significant, this analysis indicates meeting the DEQ-7 chronic aquatic life standard for copper upstream of the STP discharge point is possible. For the sediment removal alone, and assuming an effectiveness of 80 percent reduction in total recoverable concentrations, a number of exceedances over a 3-year period were predicted for copper, arsenic, iron, and lead. Results indicated zero to one exceedance per 3 years was predicted for copper at stations between the removal area and the STP. Additionally, the sensitivity analysis showed that an effectiveness as low as 50 percent would still result in an acceptable exceedance rate.

When sediment removal is combined with meeting the STP permit's effluent requirements, predicted copper will exceed the chronic aquatic performance standard one time over a 3-year period. This is allowable and is predicted to meet performance standards; however, considering the uncertainty involved in the calculations, the number of exceedances could be greater or less than one. Based on the results of this analysis, at this time, it is concluded that copper could meet chronic water quality performance standards during base flow and normal high flow. It is entirely possible that actual results following implementation of these TEs may not match the predictions, and the number of exceedances is significantly greater than the allowable amount. If after implementation of technically practicable remedial measures addressing base and normal high flow conditions, the total recoverable copper performance standard and the total recoverable lead performance standard for chronic conditions are not met, a waiver of the state standards is appropriate and will be applied.

No actions conducted within the BPSOU will change upstream conditions, and therefore it does not appear possible to meet the human health ARAR for arsenic and the chronic aquatic life ARAR for iron. For arsenic and iron, upstream or background conditions strongly influenced exceedances at the site. The upstream station is located upgradient of the BPSOU. Site

characterization of the upgradient area has not been conducted, and there has not been any analysis of the sources of arsenic and iron or their potential for control.

Total recoverable lead exceedances were minimal in the 2011 through 2013 data, and application of the sediment removal TE is predicted to reduce these exceedances to less than one per 3 years, which meets DEQ-7 compliance requirements.

7.2 Evaluation of Stormwater Remedial Technologies

The CSM in Section 5 identifies several sources with the potential to contribute to surface water contamination during storm runoff. These include:

- Erosion and runoff of exposed contaminated sediments and mine waste
- Erosion of buried contaminated material used for pipe bedding and other structural fill
- Dissolution of metal-laden salts deposited via infiltration through contaminated fill materials
- Upstream sources

As described in Section 3, the selected remedy identified the iterative Surface Water Management Program to achieve the ultimate goal of meeting surface water performance standards during storm events. The cyclical program has five steps: monitoring, compliance analysis, loading analysis, BMP selection, and BMP implementation.

According to Section 12.3.3.1 of the BPSOU ROD (EPA and MDEQ 2006), BMPs include (but are not limited to):

- Source controls of mine wastes or contaminated soil with arsenic and lead concentrations below human health action levels but with elevated concentrations of other COCs. The controls could include waste removal or engineered covers over source material along with consolidation and grading.
- Temporary or permanent engineered sediment controls, including subsurface drains, earthen dikes, straw bale dikes, silt fences, brush barriers, drainage swales, check dams, pipe slope drains, rock outlet protection, sediment traps, manhole sumps, retaining walls, drop structures, or filter strips.
- Curb and gutter system to divert run-on and runoff away from source areas.
- Detention/retention basins to decrease (detention) or capture (retention) storm flow and reduce suspended sediment loads from defined precipitation events. Ongoing monitoring will be carried out to determine optimum holding times for suspended load reduction.
- Routing of storm flows away from receiving surface water (i.e., to the Berkeley Pit or to isolated areas or sedimentation basins).
- Removal of source materials to a repository.

The BPSOU ROD included two contingencies for wet weather flow conditions:

- Capture and treatment of stormwater. If the surface water management system described in the ROD, including BMPs and engineering controls, does not achieve the RAOs, such as returning SBC to its beneficial uses and meeting ARARs, further efforts at capture and engineered treatment of stormwater or snowmelt will be required.
- Flow augmentation. Following implementation of the remedial actions and contingency measures required by the ROD, the addition of clean water flow may be considered to meet the RAOs and ARARs.

Capture and conventional treatment of stormwater was not evaluated due to the major changes required to the current lime treatment plant and a lack of available area for post-treatment settling ponds. Capture and treatment by settling without lime addition and treatment using bioretention were evaluated.

Flow augmentation was not included in this TI evaluation because an adequate water supply is not available. The supply contemplated in the ROD is being used in mining and mineral processing and is not anticipated to be available in the near future.

In 2009, Atlantic Richfield, Butte-Silver Bow County, EPA, MDEQ and their technical consultants, developed several specific and potentially implementable (i.e., at a minimum, adequate space and gradient are available) stormwater technologies for consideration of more up-front stormwater control BMPs. As previously mentioned, further upgrades were undertaken within the BPSOU between 2008 and 2013, and as a result, these technologies were reassessed and adapted for the purposes of this TI evaluation (see Table 7-13).

Table 7-13 Remedial TEs Evaluated

Technology Element	Description
TE 2	Diversion of Buffalo Gulch to the Berkeley Pit via the Belmont Diversion
TE 4	Installation of Detention/Retention Basins
TE 6	Installation of Hydrodynamic Devices in Front Street
TE 7	Additional Source Controls
TE 8	Replacement of Buried Trunk Lines
TE 9	Bioretention Basins
TE 10	Capture and Treatment of First Flush
TE 11	Diversion of upper SBC to Berkeley Pit
TE 12	Stormwater Maintenance Program
TE 13	Installation of HDD Devices
TE 14	Combination of several of the above TEs
TE 15	Combination of several of the above TEs

Each TE is evaluated in the following subsections and includes:

- A description of the technology

- The stochastic model settings (see Section 6) and assumptions used to model the effects of the technology under a Type I, 5-year, 24-hour storm event

The modeled concentration probability distribution of total recoverable concentrations for mining-related COCs at station SS-06G. This location was chosen over SS-07 to avoid the influence of the Metro STP. Based on discussions with the stakeholders and a lack of data for the Metro STP outfall, it was decided to not include the STP outfall in the model and use monitoring location SS-06G as the end of the model. The COC removal efficiencies for each of the TEs are shown in Table 7-14 and detailed in Appendix D4.

Table 7-14 Technical Element Removal Efficiencies

Technology Element	High Efficiency Removal Percentage	Low Efficiency Removal Percentage
TE2	N/A – flow diversion	
TE4	70%	5%
TE6	7%	N/A
TE7	10%	3%
TE8	3%	N/A
TE9	90%	10%
TE10	N/A – flow diversion	
TE11	N/A – flow diversion	
TE12	6%	N/A
TE13	Warren 26% Texas 14% Anaconda 23% Buffalo A 20%	N/A
TE14	Varies	Varies
TE15	Varies	Varies

N/A – not applicable

The efficiencies were estimated from literature values and discussed and agreed upon by the various stakeholders; further information and the agreed upon efficiencies and assumptions are included in Appendix D4. A technical memorandum, *Technical Memorandum 3 – Butte Priority Soils Operable Unit (BPSOU) Technology Elements Efficiency Evaluation* (Pioneer 2015c), (Tech Memo 3) prepared by AR and reviewed by EPA and MDEQ presents removal efficiencies for some of the TEs and is presented in Appendix D3.

The modeling was performed for both event mean concentration and maximum hourly average concentration scenarios. Further description of the modeling setup, execution, and results is contained in the following sections.

7.2.1 Event Mean Concentration Modeling

To simplify the presentation of the stochastic model output, concentration distribution functions are presented using event mean concentrations at sampling point SS-06G. Data are then compared to a specific hardness-based performance standard, using a range of typical hardness values. A base flow (local storm event) in Blacktail Creek of 9 cfs and a wet weather flow (regional storm event) of 60 cfs were used in the model (see Section 6 for further explanation).

Event mean concentrations are calculated as shown in the equation below:

$$SS\text{-}06G\ C_{event\ mean} = \frac{\sum Load_{SS\text{-}06G}}{\sum Flow_{SS\text{-}06G}}$$

Where:

$SS\text{-}06G\ C_{event\ mean}$ = Event mean concentration at monitoring point SS-06G

$\sum Load_{SS\text{-}06G}$ = Sum of COC load at monitoring point SS-06G

$\sum Flow_{SS\text{-}06G}$ = Sum of flows at monitoring point SS-06G

The event mean concentration modeling results were used as the initial screening method of the various TEs. Refinements to the model were carried out after all TEs had been analyzed using event mean concentration methodology. The event mean concentration is calculated over the entire hydrograph duration (90+ hours). As a result, relatively cleaner water at the beginning and end of a storm event is also diluted by water from Blacktail Creek, which can bias the final calculated concentrations low. As such, the event mean concentration method shows more favorable results (lower predicted in-stream concentrations) when compared to the other methods. Therefore, it was decided that the revised versions of the model would only analyze those TEs that had a significant effect on COC concentrations at station SS-06G, with the assumption that if a TE did not have a significant effect with the event mean concentration model, it would have an even smaller effect with the maximum hourly average model. The other modeling methods are described further in Sections 7.2.2 and 7.2.3.

The results of the event mean concentration stochastic modeling for total recoverable copper at station SS-06G, with Blacktail Creek flowing at both local and regional storm event conditions, are presented in Figures 7-2 through 7-27.

7.2.1.1 Existing Conditions – Baseline

The existing conditions within the BPSOU were assessed within the model, with no remedial actions beyond the pre-ROD stormwater control actions and the implementation of the first two cycles of post-ROD stormwater control actions, as discussed in Section 3.

This scenario assumes the existing system will continue to operate with no further contaminant reduction or protection to aquatic life in SBC. It is anticipated that contaminated sediment, high in metals concentrations, would continue to discharge to the creek and pose chronic and acute stress to aquatic life. Under existing conditions, total recoverable copper concentrations are predicted to exceed acute performance standards 100 percent of the time for both flow regimes.

The concentrations of copper seen in the existing conditions are much greater than the performance standards. As seen in Figures 7-2 through 7-15 (and detailed in Section 10 of the SWCR (EPA and MDEQ 2017), an order of magnitude reduction in copper concentrations would still only result in achieving compliance 50 percent of the time. Therefore, it is evident that regardless of what measures are implemented, copper is likely to be out of compliance. This is due both to upstream sources and sources within the BPSOU.

The existing conditions results are presented within each graph to allow the effects of the TEs to be compared to the existing conditions. Appendix E presents the various TEs, many with both high and low efficiency results, and graphed results for the other COCs.

7.2.1.2 TE 2 – Diversion of Buffalo Gulch to Berkeley Pit via the Belmont Diversion

The proposed diversion of Buffalo Gulch via Belmont Diversion for TE 2 would direct stormwater in the upper half of the Buffalo Gulch drainage area to the Berkeley Pit. The modification would extend the existing Belmont diversion to the Buffalo Gulch trunk main as it crosses Porphyry Street between South Dakota Street and Colorado Street, just south of Emma Park.

As outlined in *Technical Memorandum 2 – Butte Priority Soils Operable Unit (BPSOU) Technology Elements and HydroCAD Modeling Assumptions* (Pioneer 2015b) for TE 2, 90 percent of the storm flow in the upper portion of Buffalo Gulch would be diverted by the Belmont Extension, and 10 percent of the storm flow in the upper portion of Buffalo Gulch would continue to SBC as overland flow (see Appendix D2). Input parameters to the stochastic model are shown in Appendix F as Figure F-1.

Results for this scenario indicate minimal improvement to water quality at SS-06G across all COCs during both regional and local storm events when compared to existing water quality conditions. Based on simulation results, this scenario alone does not adequately reduce COC concentrations to within acceptable limits.

7.2.1.3 TE 4 – Installation of Detention/Retention Basins

TE 4 includes the installation of detention/retention basins in two strategic locations for the purpose of removing total suspended solids (TSS) and associated contaminants from stormwater. It is assumed that given sufficient residence time in the detention/retention basins, a large percentage of the total recoverable metals will be removed once the TSS have settled out, with only a small fraction discharged into SBC. The basins have been conceptually designed to provide a 24-hour centroid detention for the 10-year, 24-hour storm event. It is noted the 24-hour detention requirement does not optimize the conceptual volume of the pond nor the detention time for the 5-year storm; therefore, the expected detention time would be less than the 24 hours (Pioneer 2015a). In addition, the modeling was performed only for a detention basin scenario. A retention basin would be assumed to be full of water to the lowest orifice elevation and therefore would function simply as a detention basin.

This remedial technology is a standard and proven BMP for decreasing settleable contaminants in stormwater and attenuating peak flows.

The two locations for the basins identified and evaluated as part of this TI are shown in red in Figure 7-1 and include:

- BG-01 – area near BG-01 outfall east of Montana Street and south of Safeway
- Upper SBC – area within East Side Diggings – referred to as George Street basin

A more detailed description of the basins is provided below.

BG-01 Installation of a Detention/Retention Basin at Buffalo Gulch

The conceptual design of the Buffalo Gulch basin assumes that a 10-year, 24-hour storm event within Buffalo Gulch can be detained using a single detention basin, with an overall capacity of 24.8 acre-feet. For the purposes of this TI, the detention basin has been evaluated with a 5-year, 24-hour Type I storm event, with a depth of 1.6 inches. Using this design, the 5-year, 24-hour Type I storm event has a detention time of approximately 22.1 hours.

It is assumed the Buffalo Gulch storm main will be intercepted at a location immediately upstream of the culvert outlet at stormwater monitoring station BG-01 and routed to the inlet of the Buffalo Gulch detention/retention basin.

Upper SBC Detention/Retention Basin Conceptual Design

The conceptual design for the upper SBC basin assumes all stormwater reporting to the upper SBC channel (including contributions from East Buffalo Gulch) would be routed into the basin. The volume of the forebay has been incorporated into a larger detention/retention basin, with an overall capacity of 38.2 acre-feet, which is marginally below the 10-year runoff volume for the upper SBC drainage basin at upper SBC-R-12 of 38.4 acre-feet.

Much like the Buffalo Gulch basin, the upper SBC basin has been designed to accommodate a 10-year, 24-hour Type I storm event; however, for the purpose of this TI, the basin has been evaluated with a 5-year, 24-hour Type I storm, with a detention time of approximately 22.1 hours.

To route flows from the upper SBC channel to the detention basin, a diversion would be required to provide enough head for conveyance. The structure would contain a concrete weir structure modeled with two 48-inch pipes, which would convey the stormwater to the basin.

Simulations were carried out as three individual scenarios and included:

- Installation of a basin at Buffalo Gulch only
- Installation of a basin at upper SBC only
- Installation of a basins at both Buffalo Gulch and upper SBC

Stochastic model outputs for the total recoverable metals at station SS-06G for both flow regimes and the input parameters of the stochastic model are shown in Appendix F as Figure F-2.

Results indicate that construction of a single detention/retention basin at either Buffalo Gulch or upper SBC would not reduce in-stream COC concentrations sufficiently to meet current water quality performance standards during storms. Figures 7-3 through 7-8 show the effects on copper concentrations when either of these basins is constructed. However, under the scenario where the basins would be installed simultaneously at BG-01 and upper SBC, simulations indicate a considerable improvement in water quality would occur. Although the majority of COCs would remain above the acute performance standard during a significant period of time for both flow regimes, the one exceedance every 3-year limit probably would be met for silver and cadmium, with assumed high removal efficiencies. Silver is predicted to have a greater than 99 percent predicted probability of meeting water quality performance standards for both regional and local

storm conditions. Cadmium is also predicted to meet performance standards 96 to 97 percent of the time. Low efficiency scenarios also indicate an improvement in water quality; however, only silver potentially would be within the limit to meet exceedance criteria.

The reduction in COC concentrations as a result of the combined retention/detention basins for TE 4 is significant and greater than all but TE 9 (bioretention basins), even in simulations using a low removal efficiency. It is clear from these results that water management and the timing and attenuation of stormwater peak flows has a significant impact on predicted COC concentrations in SBC at SS-06G.

7.2.1.4 TE 6 – Installation of Hydrodynamic Devices

This scenario involves the installation of an HDD on Front Street near the intersection of Kaw Avenue and Front Street. To date, HDDs have been installed at Warren Avenue, Anaconda Road, Buffalo Gulch, Texas Avenue, and Montana Street. An HDD is a manufactured structure that is installed like a manhole and works to capture solids and suspended sediments through the use of vortex-based dynamic sediment separation. The captured sediment is stored in a sump at the bottom of the structure that must be cleaned regularly to ensure sufficient capacity for storing captured sediments.

This TE would reduce the concentration of TSS and associated heavy metals from stormwater that flows through the eastern portion of the main Buffalo Gulch drainage, in turn, reducing contaminant loading to SBC.

The location of the HDD is such that it only receives a portion of the runoff from the East Buffalo Gulch watershed. In addition, analysis in Tech Memo 3 showed that the HDD sump would fill with sediment relatively quickly during a 5-year storm event. As such, only 9.8 percent of the total volume of stormwater from the East Buffalo Gulch watershed is predicted to be treated by the HDD. These devices do not attenuate peak flow; therefore, only the concentrations of water chemistry would be modified. Appendix F (see Figure F-3) shows a summary of input parameters and probability distribution outputs during local storm and regional storm events.

On its own, the HDD shows minimal improvement in water quality at SS-06G and does not remove enough contaminants to achieve acute performance standards in SBC (Figure 7-9). None of the COCs assessed for this TE would be reduced enough to meet acute water quality performance standards.

7.2.1.5 TE 7 – Additional Source Controls

This element assumes surface or aboveground BMPs will be implemented to reduce the amount of contaminated source material from entering the stormwater conveyance system and consequently SBC. The purpose of this action is to minimize further scour and possible damage to buried pipes and the exposure of further waste materials within the BPSOU.

An analysis of stormwater sampling data that were available from before and after some source control measures were implemented indicated a removal efficiency range of 3 to 10 percent for low and high efficiencies, respectively, was appropriate and applied to all applicable watersheds (Figures 7-10 through 7-13). The data set was limited, but the majority of the source areas on the Butte Hill have been reclaimed already; therefore, a 10 percent reduction is considered an

optimal estimate. Details relating to reduction efficiencies and flows are shown in Appendix F as Figure F-4.

Results of the modeling show a decrease in in-stream COC concentrations at SS-06G for both regional and local storm events. However, the decreases are relatively minimal, and the predicted exceedance rates are minimally affected. TE 6 alone does not sufficiently reduce in-stream COC concentrations below acute performance standards.

7.2.1.6 TE 8 – Replacement of Buried Stormwater Trunk Lines

TE 8 involves the replacement of stormwater trunk lines, including at Texas Avenue, Warren Avenue, Anaconda Road, Locust Street, and Missoula Gulch. Inspections of the stormwater trunk lines, which convey stormwater to SBC, revealed they are in a dilapidated state. Photographs depict blue metal salts and iron-stained concrete and bricks through the lines. Stormwater samples also indicate the drainage areas are contributing to elevated metal loads to the creek. Furthermore, this option has also been considered as a potential scenario due to limited space available for surface BMPs.

Replacing the trunk lines would provide a clean conduit for stormwater runoff and reduce infiltration rates into the system. It assumes the majority of contaminated bedding material is associated with major trunk lines and that improvements to water quality would result if the existing trunk line bedding material is removed and replaced with clean bedding material.

This simulation was performed to examine the impacts of replacing the Texas Avenue, Locust Avenue, Warren Avenue, and Missoula Gulch trunk line drainages alone (Figure 7-14). A conservative reduction of 3 percent was assumed for each drainage area, with discharge flows remaining unchanged (see Appendix F for amendments to the efficiency rates).

The results presented in Appendix E indicate a minor change would occur to predicted total recoverable COCs at SS-06G. However, concentrations for all metals would remain above acute performance standards for a large percentage of the time. TE 8 alone is not an adequate solution in reducing metals concentrations in waters flowing into SBC.

7.2.1.7 TE 9 – Bioretention Basins

This TE involves the construction of bioretention basins at two locations (Buffalo Gulch and upper SBC), the same locations as those proposed for TE 4 (see Figure 7-1). The dimensions of each basin are also the same as the basins modeled in TE 4; however, the total storage volume is reduced as a result of 3 feet of engineered soil media and an underdrain system.

Bioretention basins passively treat stormwater by filtering the runoff as it passes through the engineered soil media. Contaminants and TSS are filtered out within the media. Dissolved metals can also be removed through biological and chemical (sorption) actions. TSS removal rates on the order of 90 to 100 percent have been observed in field and laboratory studies. Water that passes through the engineered soil media is collected in the underdrain and discharged from the basin. In larger storms, some stormwater will leave the basin untreated via the primary or emergency spillway. However, for the purposes of the TI model, the basins are large enough to allow all water from the 5-year design storm event to filter through the engineered media prior to leaving the basin. Bioretention basins also provide peak attenuation, similar to a detention basin.

For the purpose of this TI, efficiency removal rates for the bioretention basins were 90 and 10 percent to simulate high and low efficiency, respectively, with three alternative scenarios considered. These included:

- Installation of a bioretention basin at Buffalo Gulch only
- Installation of a bioretention basin at upper SBC only
- A combined approach with the installation of bioretention basins at both Buffalo Gulch and upper SBC-3A

Amendments to efficiency rates and results are presented in Appendix F and Appendix E, respectively.

Results of the modeling show positive impacts on water quality at SS-06G if a bioretention basin is constructed at either Buffalo Gulch or upper SBC. However, even with a high efficiency removal, the reduction in COC concentrations is not sufficient to consistently meet acute water quality performance standards.

Results for simulations where basins were constructed at both locations show much greater reductions in in-stream COC concentrations (Figures 7-15 through 7-20). At a 90 percent removal efficiency rate, silver and cadmium concentrations are predicted to consistently remain below acute performance standards during both regional and local storm event periods, with lead concentrations consistently meeting the acute performance standard during a simulated local storm event. Copper and zinc concentrations would consistently remain above acute performance standard threshold limits. Improvements to water quality are also shown to occur at a 10 percent low removal efficiency, with silver concentrations remaining below the performance standard during both a regional and local storm event. No other COC concentrations fell below the required threshold as a result of the low efficiency scenario.

Similar to TE 4, the water management and peak flow attenuation from the bioretention basins have a large impact on surface water quality even at low removal efficiency rates.

7.2.1.8 TE 10 – Capture and Treat First Flush

TE 10 involves the construction of conceptual retention basins at Buffalo Gulch and upper SBC, with the purpose of retaining 5 percent of the Buffalo Gulch 10-year runoff volume and 10 percent of the upper SBC runoff volume. The intent being to capture the first flush of more contaminated runoff and send it to the BTL for treatment. Any stormwater captured during the initial flush would have a COC removal efficiency of 100 percent, whereas stormwater that would bypass the basins after the predicted periods and discharge directly to SBC would have a removal efficiency of 0 percent.

The theory behind TE 10 is that the initial runoff from a storm contains higher COC concentrations than the later. Therefore, stormwater runoff containing higher COC concentrations would be removed from the system and treated elsewhere prior to being discharged back into SBC.

For further detail relating to efficiencies, refer to Tech Memo 3 (Pioneer 2015c) in Appendix D3.

Simulations were carried out as three separate scenarios (Figures 7-21 through 7-23), including:

- Installation of a first flush basin at Buffalo Gulch only
- Installation of a first flush basin at upper SBC only
- Installation of first flush basins at both Buffalo Gulch and upper SBC

Flow and concentrations that have been altered in the stochastic model to simulate this scenario are described further and results presented in Appendix F and Appendix E, respectively. Results of the modeling show reductions in COC concentrations at SS-06G. However, the reductions are not sufficient to consistently meet acute water quality performance standards.

7.2.1.9 TE 11 – Diversion of Upper SBC to Berkeley Pit

TE 11 focuses on two scenarios in which 50 percent of stormwater flows and 100 percent of stormwater flows originating within the upper SBC will be rerouted from MSD-3A to the Berkeley Pit (see Appendix F). This rerouted stormwater is considered removed from the system, effectively providing for 100 percent treatment efficiency. However, the water is also removed from the stream; therefore, the flow rates within SBC are lower.

Results of the modeling show significant reductions in COC concentrations for both local and regional storm events (Figures 7-24 and 7-25, and Appendix E). However, except for silver, the reductions are not sufficient to consistently meet acute water quality performance standards. For silver, a predicted exceedance rate of 4 to 6 percent is seen for both local and regional storm events.

7.2.1.10 TE 12 – Stormwater Maintenance Program

TE 12 involves undertaking regular maintenance on the existing stormwater network to remove sediments and repair infrastructure. An efficiency range of 1 to 6 percent was used for low and high efficiency, respectively (see Appendix F). It was assumed that no change to the hydrographs would result from TE 12.

Model outputs using this scenario (Figure 7-26) indicate a slight to negligible effect in the reduction of contaminant concentrations when compared to existing conditions (Appendix E). Consequently, as a standalone technology, TE 12 would not adequately reduce COC concentrations below acute performance standards.

7.2.1.11 TE 13 – Installation of Hydrodynamic Device Filters

TE 13 includes the installation of Contech StormFilter-manufactured filtration units downstream of the four existing HDDs and the one proposed HDD on Front Street. There are various types of filters that can be used, with media filters selected to remove particulate and dissolved contaminant loads through both physical filtration and chemical treatment processes to maximize removal of total recoverable and dissolved metals from the effluent stream of each unit.

Efficiencies for the scenario are detailed in Tech Memo 3 (see Appendix D3) and Appendix E. In addition, Tech Memo 3 analyzed the expected rate at which the filters would occlude, thereby reducing the treatment efficiency to 0 percent. The filters have a limited capacity, with the largest

proposed filter capable of treating 800 gpm, and the location of some of the HDD and filters means not all flow from the watersheds can pass through the filter. As a result, the filters treat only 13 to 26 percent of the flow from the watersheds, with two of the locations (Texas Avenue and Buffalo Gulch) being occluded after 10 and 14 hours of a storm, respectively.

Due to the relatively low treatment efficiency and the short time before the filters are plugged and no longer functioning, the results indicate a minimal effect of the HDD filters on in-stream COC concentrations (Figure 7-27 and Appendix E). As a result of the low effectiveness and concerns over maintenance, TE 13 is not evaluated further within this TI.

7.2.2 Maximum Hourly Average Modeling

Following the completion of the initial event mean concentration model runs, the stochastic model was modified to calculate the maximum hourly average concentration of copper during the simulation period. Water quality performance standards are based on a maximum hourly average concentration; thus, this change was made such that the predicted results could be more accurately compared to the water quality performance standards. In addition, as described in Section 6, a water hardness distribution function at station SS-06G was added to the model, allowing for calculation of the hardness-based water quality performance standards. Event mean concentration modeling uses a range of typical hardness-based performance standards, whereas modeling using a hardness distribution function allows direct comparison to specific hardness-based performance standards. This change allowed exceedance percentages to be calculated for each COC within a model run.

Based on the results of the initial modeling, it is apparent that TE 4 and TE 9, retention/detention and bioretention basins, respectively, provide the most benefit in reducing in-stream COC concentrations. From the data presented in Figures 7-2 through 7-27, it is apparent that these two TEs account for the largest portion of the removal efficiencies of the combinations. As a result, in addition to the combinations evaluated, TE 4 and TE 9 were modeled with the maximum hourly average model to determine exceedance percentages for them as individual TEs.

7.2.2.1 TE 4 – Retention/Detention Basins

Simulations using the updated model were run for the three options previously modeled: basins at Buffalo Gulch only, upper SBC only, and basins at both Buffalo Gulch and upper SBC. The results displayed as exceedance percentages are shown in Table 7-15 for high removal efficiency. The exceedance percentage is calculated by tabulating the number of predicted exceedances in one model run consisting of 10,000 simulations and dividing that number by the total number of simulations. It is a measure of the probability of an exceedance in the hypothetical 5-year 24-hour storm event used in the model, which is not directly analogous to water quality performance standard allowable exceedance rates of 1 excursion per 3 years.

The tables presented below, and elsewhere in this section, are color coded as follows:

- Green = < 5 percent exceedance rate
- Yellow = 5 to 10 percent exceedance rate
- Orange = >10 percent exceedance rate

Table 7-15 TE4 – High Efficiency Results with Maximum Hourly Average

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	99.99	96.02	64.75	19.23	47.54
	Local Storm	99.99	98.66	75.09	28.60	59.70
TE4 – Detention Basin BG only	*Regional Storm*	100	84.67	35.31	5.38	20.76
	Local Storm	100	95.39	47.86	9.18	31.15
TE4 – Detention Basin upper SBC only	*Regional Storm*	100	88.05	53.87	17.62	40.06
	Local Storm	100	94.18	65.42	26.87	52.35
TE4 – Detention Basin BG and upper SBC	*Regional Storm*	99.75	39.53	8.01	1.16	4.23
	Local Storm	99.95	55.17	8.00	0.57	3.62

BG – Buffalo Gulch

Results in Table 7-15 show that individual basins do not provide sufficient reductions in COCs to consistently meet performance standards during a 5-year storm event. However, if basins were constructed at both Buffalo Gulch and upper SBC, results indicate a notable decrease for both silver and cadmium would occur, and it is predicted that it may be possible to meet acute water quality performance standards for these COCs and potentially lead. Lead levels are also predicted to be notably reduced; however, it may not be enough to consistently meet water quality performance standards. Copper and zinc are still clearly out of compliance, and it could be considered technically impracticable to meet performance standards with this TE due both to the large loads entering from the operable unit as well as upstream conditions.

Low efficiency results are shown in Table 7-16. Results where basins are constructed at both Buffalo Gulch and upper SBC indicate silver is the only COC with the potential to meet performance standards under this scenario.

Table 7-16 TE4 – Low Efficiency Results with Maximum Hourly Average

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	99.99	96.02	64.75	19.23	47.54
	Local Storm	99.99	98.66	75.09	28.60	59.70
TE4 – Detention Basin BG only	*Regional Storm*	100	87.58	39.84	6.02	24.35
	Local Storm	100	96.46	55.79	12.30	37.69
TE4 – Detention Basin upper SBC only	*Regional Storm*	100	89.21	54.92	17.80	40.61
	Local Storm	100	95.81	68.24	27.61	54.06
TE4 – Detention Basin BG and MSD	*Regional Storm*	100	65.11	18.55	2.19	9.47
	Local Storm	100	85.50	35.13	5.31	20.61

7.2.2.2 TE 9 – Bioretention Basins

TE 9 (bioretention basins) was modeled using the three options previously modeled, including individual basins at Buffalo Gulch or upper SBC and an option with basins at both Buffalo Gulch and upper SBC. Results for the high removal efficiency are presented in Table 7-17.

Table 7-17 TE9 – High Efficiency Results with Maximum Hourly Average

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	99.99	96.02	64.75	19.23	47.54
	Local Storm	99.99	98.66	75.09	28.60	59.70
TE9 – Bioretention BG only	*Regional Storm*	100	82.98	33.66	4.87	19.95
	Local Storm	100	93.95	44.70	8.45	28.34
TE9 – Bioretention upper SBC only	*Regional Storm*	100	87.33	53.52	17.31	40.00
	Local Storm	100	93.67	64.88	26.75	52.02
TE9 – Bioretention BG and upper SBC	*Regional Storm*	99.20	31.05	6.67	0.95	3.67
	Local Storm	99.82	37.84	2.59	0.15	0.93

Results indicate a decrease in contaminants would occur if individual basins were constructed; however, these decreases are insufficient to consistently meet performance standards. Alternatively, if high efficiency basins were constructed at both Buffalo Gulch and upper SBC, results indicate a significant decrease would occur for lead, silver, and cadmium, and these COCs could potentially meet the one in 3-year exceedance criteria. Zinc concentrations would drop significantly but not enough to meet performance standards, and copper is predicted to never meet acute water quality performance standards.

Low efficiency results for TE 9 are shown in Table 7-18. In this instance, silver is still likely to meet performance standards for the combined option, but lead and cadmium have higher exceedance rates than the high efficiency predictions.

Table 7-18 TE9 – Low Efficiency Results with Maximum Hourly Average

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	99.99	96.02	64.75	19.23	47.54
	Local Storm	99.99	98.66	75.09	28.60	59.70
TE9 – Bioretention BG only	*Regional Storm*	100	89.48	42.64	7.07	25.79
	Local Storm	100	97.18	59.14	14.35	41.89
TE9 – Bioretention upper SBC only	*Regional Storm*	100	89.38	54.78	18.87	40.75
	Local Storm	100	95.41	67.76	27.29	53.75
TE9 – Bioretention BG	*Regional Storm*	99.98	66.79	21.35	2.69	11.95

and upper SBC	*Local Storm*	100	87.72	40.65	8.12	25.87

7.2.2.3 TEs 14 and 15 – Combination of BMP Elements, including Catch Basins

The next phase of modeling (TEs 14 and 15) were the combination elements. This consisted of combining the various individual TEs in such a way that they worked in a series to remove contaminants from stormwater runoff. Table 7-19 presents the various combinations evaluated. Figures 7-28 through 7-33 show flowcharts and calculations on how the TEs were combined and how the removal efficiency of each combination was calculated.

Table 7-19 Combination TEs

Combination	TEs in Combination
TE 14a	2, 7, 12, 10, 4
TE 14b	2, 7, 12, 10, 8, 9
TE 14c	2, 7, 12, 6, 8, 10, 4
TE 14d	2, 7, 12, 6, 8, 10, 9
TE 15a	2, 7, 12, 11, 10, 4
TE 15b	2, 7, 12, 11, 10, 9
TE 15c	2, 7, 12, 6, 8, 11, 10, 4
TE 15d	2, 7, 12, 6, 8, 11, 10, 9

Results for the high efficiency combination TEs are presented in Table 7-20. Lead, silver, and cadmium are predicted to likely meet water quality performance standards. However, as mentioned previously, the majority of the effectiveness of the various combinations comes from either TE 4 or TE 9. Comparing the results of TEs 14 and 15 to the results of TE 4 and TE 9 where basins were built at both Buffalo Gulch and upper SBC shows relatively little difference despite the significantly larger scope of work to implement the BMPs in TEs 14 and 15. Similar to TEs 4 and 9, copper and zinc concentrations are not reduced sufficiently to meet performance standards.

Table 7-20 High Efficiency Results for Combined Elements – Maximum Hourly Average

Contaminant of Concern		Copper	Zinc	Lead	Silver	Cadmium
Scenario		**Exceedance Percentage (%)**				
TE 14a	*Regional Storm*	99.36	33.41	7.11	1.03	3.84
	Local Storm	99.81	39.09	4.37	0.35	1.83
TE 14b	*Regional Storm*	98.60	28.26	6.14	1.13	3.41
	Local Storm	99.39	25.23	1.55	0.08	0.59
TE 14c	*Regional Storm*	99.16	32.17	7.05	1.05	3.78
	Local Storm	99.75	35.86	4.07	0.17	1.64
TE 14d	*Regional Storm*	98.55	27.52	6.30	1.05	3.56
	Local Storm	99.54	24.99	1.35	0.05	0.54
TE 15a	*Regional Storm*	98.94	31.47	6.89	1.1	3.81
	Local Storm	99.71	37.07	3.9	0.31	1.86
TE 15b	*Regional Storm*	98.97	29.27	6.53	1.09	3.75
	Local Storm	99.54	30.84	2.1	0.13	0.8
TE 15c	*Regional Storm*	98.93	30.73	6.93	1.04	3.74
	Local Storm	99.72	32.92	3.42	0.17	1.47
TE 15d	*Regional Storm*	98.77	28.12	6.44	1.05	3.46
	Local Storm	99.54	28.93	1.41	0.07	0.58

The results for TEs 14 and 15 assume all TEs within the combination are either high or low efficiency. In reality, it may be that some of the TEs operate with high efficiency and others at lower efficiency within the same combination. Results during high efficiency simulations for all combined TEs, as shown in Table 7-20, indicate a significant decrease in excursion frequency would occur for both silver and cadmium. Lead during local storm events would most probably remain within exceedance limits; however, results indicate during regional storm events contaminants are likely to exceed ARARs more than permitted. Zinc exceedance frequencies moderately decrease, whereas copper exceedance frequencies negligibly decrease.

Low efficiency results are presented in Table 7-21. At the low efficiency range, silver is the only COC that is predicted to meet water quality performance standards consistently.

Table 7-21 Low Efficiency Results for Combined Elements – Maximum Hourly Average

Contaminant of Concern		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
TE 14a	*Regional Storm*	99.98	60.63	15.81	1.76	8.28
	Local Storm	99.99	80.57	29.13	3.89	16.63
TE 14b	*Regional Storm*	99.96	65.21	20.74	2.66	11.46
	Local Storm	100	85.22	38.96	7.45	24.34
TE 14c	*Regional Storm*	99.95	59.33	15.35	1.68	7.57
	Local Storm	100	77.32	27.56	2.27	14.99
TE 14d	*Regional Storm*	99.97	65.62	19.59	2.36	10.25
	Local Storm	100	82.18	36.12	6.71	22.05
TE 15a	*Regional Storm*	99.69	47.05	11.94	1.6	6.58
	Local Storm	99.97	64.88	19.56	3.13	11.73
TE 15b	*Regional Storm*	99.84	57.5	17.62	2.73	10.41
	Local Storm	99.99	76.88	32.27	7.52	21.21
TE 15c	Regional Storm	99.71	45.44	11.37	1.66	6.14
	Local Storm	99.95	60.52	16.83	2.60	9.73
TE 15d	*Regional Storm*	99.79	51.36	15.20	2.03	8.39
	Local Storm	99.99	68.49	26.07	5.37	16.73

7.2.3 Upstream Allowance

The model was refined further by adding an upstream accounting method, which allows for upstream influences on water quality within the BPSOU. The method first compares the downstream sample concentration at SS-06G to the downstream performance standard. If the downstream performance standard is not exceeded, there is no further comparison to upstream. If the downstream sample exceeds the performance standard, the method compares the upstream concentration at station SS-01 to the downstream concentration. If the upstream concentration is greater than the downstream concentration, there is no exceedance regardless of whether downstream is greater than the performance standard. If downstream is greater than upstream and exceeds the performance standard, there is an exceedance. The flowchart in Figure 7-34 outlines the method.

The @Risk model was modified to include this upstream allowance comparison. A distribution function for copper concentration at SS-01 was added to the model to serve as the upstream point for the comparison methodology, and a series of if-then statements follow through the flowchart. The maximum hourly average version of the model, with the calculated hardness-based standards, is used for the method.

As discussed previously, retention/detention and bioretention basins, TE 4 and TE 9, respectively, are the primary drivers for the efficiencies of the combinations presented in TE 14

and TE 15. As a result, only TEs 4 and 9 were evaluated with the upstream allowance to allow for an easy comparison between the results. The results for TEs 4 and 9 with the upstream allowance are presented in the tables below.

Table 7-22 TE4 – High Efficiency Results – Exceedance with Upstream Allowance

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	87.95	84.83	59.04	18.58	44.28
	Local Storm	99.99	98.65	75.09	28.60	59.70
TE4 – Detention Basin BG only	*Regional Storm*	80.82	68.96	30.06	4.85	18.16
	Local Storm	100	95.39	47.86	9.18	31.15
TE4 – Detention Basin upper SBC only	*Regional Storm*	83.61	75.44	49.12	17.08	37.45
	Local Storm	100	94.18	65.42	26.87	52.35
TE4 – Detention Basin BG and upper SBC	*Regional Storm*	62.51	25.29	5.78	0.92	3.23
	Local Storm	99.90	55.15	8.00	0.57	3.62

Table 7-23 TE4 – Low Efficiency Results – Exceedance with Upstream Allowance

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	87.95	84.83	59.04	18.58	44.28
	Local Storm	99.99	98.65	75.09	28.60	59.70
TE4 – Detention Basin BG only	*Regional Storm*	81.85	72.02	34.16	5.51	21.57
	Local Storm	99.99	96.45	55.79	12.30	37.69
TE4 – Detention Basin upper SBC only	*Regional Storm*	84.40	76.78	50.27	17.17	38.03
	Local Storm	100	95.81	68.24	27.61	54.06
TE4 – Detention Basin BG and upper SBC	*Regional Storm*	72.51	47.79	14.69	1.98	7.78
	Local Storm	99.99	85.49	35.13	5.31	20.61

Table 7-24 TE9 – High Efficiency Results – Exceedance with Upstream Allowance

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	87.95	84.83	59.04	18.58	44.28
	Local Storm	99.99	98.65	75.09	28.60	59.70
TE9 – Bioretention BG only	*Regional Storm*	80.19	66.78	28.63	4.43	17.31
	Local Storm	100	93.95	44.70	8.45	28.34
TE9 – Bioretention upper SBC only	*Regional Storm*	83.41	74.79	48.79	16.70	37.28
	Local Storm	99.98	93.65	64.88	26.75	52.02
TE9 – Bioretention BG and upper SBC	*Regional Storm*	58.34	18.65	4.76	0.75	2.77
	Local Storm	99.73	37.83	2.59	0.15	0.93

Table 7-25 TE9 – Low Efficiency Results – Exceedances with Upstream Allowance

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	87.95	84.83	59.04	18.58	44.28
	Local Storm	99.99	98.65	75.09	28.60	59.70
TE9 – Bioretention BG only	*Regional Storm*	83.51	74.92	37.09	6.60	23.25
	Local Storm	100	97.18	59.13	14.35	41.89
TE9 – Bioretention upper SBC only	*Regional Storm*	84.36	76.58	49.97	17.33	38.11
	Local Storm	100	95.53	67.83	27.90	54.07
TE9 – Bioretention BG and upper SBC	*Regional Storm*	73.69	49.95	17.54	2.41	10.19
	Local Storm	99.97	87.71	40.65	8.12	25.87

The inclusion of an upstream allowance as conceptualized in Figure 7-34 does not significantly change the overall results. Though copper and zinc have greatly reduced exceedance percentages, they are both still predicted to exceed performance standards most of the time. For other COCs that are closer to meeting performance standards, the exceedance percentages do not change significantly. None of the changes are enough to move a result from one of the color-coded categories in the tables. Tables 7-26 and 7-27 present the difference in exceedance percentages for TEs 4 and 9 without and with the upstream allowance parameter.

Table 7-26 Difference between without and with Upstream Allowance Parameter – High Efficiency

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Difference in Exceedance Percentage (%)				
Existing Conditions	*Regional Storm*	12.0	11.2	5.7	0.7	3.3
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE4 – Detention Basin BG only	*Regional Storm*	19.2	15.7	5.3	0.5	2.6
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE4 – Detention Basin upper SBC only	*Regional Storm*	16.4	12.6	4.8	0.5	2.6
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE4 – Detention Basin BG and upper SBC	*Regional Storm*	37.2	14.2	2.2	0.2	1.0
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE9 – Bioretention BG only	*Regional Storm*	19.8	16.2	5.0	0.4	2.6
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE9 – Bioretention upper SBC only	*Regional Storm*	16.6	12.5	4.7	0.6	2.7
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE9 – Bioretention BG and upper SBC	*Regional Storm*	40.9	12.4	1.9	0.2	0.9
	Local Storm	0.1	0.0	0.0	0.0	0.0

Table 7-27 Difference between without and with Upstream Allowance Parameter – Low Efficiency

Technology Element		Copper	Zinc	Lead	Silver	Cadmium
Scenario		Difference in Exceedance Percentage (%)				
Existing Conditions	Regional Storm	12.0	11.2	5.7	0.7	3.3
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE4 – Detention Basin BG only	Regional Storm	18.2	15.6	5.7	0.5	2.8
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE4 – Detention Basin upper SBC only	Regional Storm	15.6	12.4	4.7	0.6	2.6
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE4 – Detention Basin BG and upper SBC	Regional Storm	27.5	17.3	3.9	0.2	1.7
	Local Storm	0.0	0.0	0.0	0.0	0.0
TE9 – Bioretention BG only	Regional Storm	16.5	14.6	5.6	0.5	2.5
	Local Storm	0.0	0.0	0.0	0.0	0.0

TE9 – Bioretention upper SBC only	Regional Storm	5.6	12.8	4.8	1.5	2.6
	Local Storm	0.0	-0.1	-0.1	-0.6	-0.3
TE9 – Bioretention BG and upper SBC	Regional Storm	26.3	16.8	3.8	0.3	1.8
	Local Storm	0.0	0.0	0.0	0.0	0.0

7.2.4 Wet Weather Summary

Multiple TEs to reduce COC concentrations during wet weather events were evaluated in Section 7.2. These included source controls, detention basins, bioretention basins, and other stormwater BMPs. Based on the results of the various analyses, it is clear that copper and zinc are not likely to meet acute water quality performance standards, regardless of what measures are implemented to control the COCs. The results provide rationale for a TI waiver for acute water quality performance standards for copper and zinc in wet weather flow conditions. However, cadmium, lead, and silver could meet acute water quality performance standards, depending on what TEs are implemented and what the efficiencies of those TEs are. Additionally, the inclusion of an upstream allowance parameter does not significantly affect the results. The results presented above provide the basis for the choice of the alternative remedial technology that will be discussed further in Section 8.

Section 8

Alternative Remedial Strategy

As described in the 2006 ROD, the overall remedial goal for surface water in the BPSOU is compliance with surface water quality performance standards identified in DEQ-7 for all flow conditions within the designated surface waters of the BPSOU and directly downstream of the BPSOU. Since completion of the ROD in 2006, a large number of surface water samples have been collected and analyzed, resulting in refinements of several elements of the selected remedy for surface water in the BPSOU and, based on the modeling and analysis presented in previous sections of this report, the development of the alternative remedial strategy—that is, the waiver of certain surface water performance standards and the replacement of those performance standards with alternative protective standards—discussed in this section. The alternative remedial strategy includes additions and/or modifications to the selected remedy in the ROD, which will also be outlined in a proposed plan for public comment.

8.1 Base Flow and Normal High Flow

8.1.1 Alternative Remedial Strategy Components

The selected remedy for base and normal high flow events, as described in the ROD, consists of three primary actions: contaminated groundwater control; excavation of contaminated sediment, stream banks, and nearby floodplain wastes; and flow augmentation if needed. Substantial groundwater control has been implemented. For this TI evaluation, the effectiveness of bed, bank, and sediment removal was evaluated for this flow regime. The effectiveness of contaminated sediment, stream banks, and nearby floodplain waste removal was estimated to be sufficient or within the range of uncertainty, along with continued and improved contaminated groundwater control, to achieve water quality performance standards for most COCs under base and normal high flow conditions. This remedial element is retained and expanded as part of the remedy. Upstream of the BPSOU, water quality exceeds performance standards for arsenic and iron during normal high flow conditions, resulting in exceedances as the water flows through the BPSOU. For COCs where water quality performance standards are not likely to be met, the alternative remedial strategy for base flow and normal high flow conditions would modify the selected remedy by incorporating the following components:

- Institutional controls – If necessary, institutional controls (ICs) may need to be developed to address potential human consumption of surface water exceeding the human health performance standard for arsenic if the standard is not met (expectations are that it will be met). Currently, BPSOU surface water is not used for human consumption.

- Upstream allowance – This component recognizes that water quality upstream of the BPSOU does not consistently meet aquatic performance standards during normal high flow, resulting in exceedances as the water flows through the BPSOU. The upstream allowance is a method to account for upstream influences on water quality within the BPSOU. The principle of the method is that surface water exiting the site must not have higher concentrations of COCs than water entering the site. Details of the method will be included

in the BPSOU Consent Decree. The 2006 BPSOU ROD provided for consideration of this type of methodology. It is a methodology also used at other operable units within the Clark Fork Basin Superfund sites.

The analysis of TEs in Section 7 concluded that after implementation of the contaminated sediments, stream banks, and nearby floodplain waste remedial actions, along with increased groundwater capture and treatment, the MDEQ-7 total recoverable chronic standards for copper and lead may be met during base and normal high flow conditions (they are within the range of uncertainty). Therefore, the up-front waiver of the total recoverable copper and lead chronic performance standards are not warranted at this time.

However, there is uncertainty associated with this analysis of TEs in Section 7. It is a predictive analysis based on certain assumptions, which may not prove fully valid after field implementation. If after implementation of technically practicable remedial measures addressing base and normal high flow conditions, the total recoverable copper performance standard and the total recoverable lead performance standard for chronic conditions are not met, a waiver of the state standards is appropriate and will be applied. Replacement performance standards will be Clean Water Act Section 304(a) ambient water quality criteria (AWQC) recommended by EPA. These criteria are based on the best available science, scientific literature review, and established procedures for risk assessment and provide quantitative concentrations of pollutants that, if not exceeded, will generally assure adequate water quality for protection of designated uses (EPA 2017). The waived-to 304(a) criterion for lead uses the same MDEQ-7 numerical standard except that a dissolved conversion factor is applied to the total recoverable numeric standard, the analysis is for dissolved metals, and there is no minimum or maximum value for hardness. The total recoverable copper performance standard defined in the BPSOU ROD uses hardness as a variable in calculation of the performance standard. The waived-to 304(a) copper criterion will be the Biotic Ligand Model (BLM) criterion, which uses several input variables to arrive at a performance standard. It is anticipated that the BLM may evolve or change in the future; thus, the waived-to performance standard will be the BLM criterion in place at the time of post-implementation compliance determination.

The evaluation of the surface water data indicated that the Metro STP effluent is the largest source of copper loading to surface waters during normal high flow and base flow conditions (EPA and MDEQ 2017). The Metro STP recently installed substantial improvements to its system, which may address metals loading from the facility. Currently, the Metro STP has no effluent limitations on metals; however, after the prescribed date, cadmium, copper, mercury, and zinc must meet standards specified in the permit (MDEQ 2012). It is assumed that actions to meet the standards will be completed on a schedule permitted under state law per the MDEQ permit requirements.

An ongoing source of sediment contamination to surface water is stormwater runoff from BPSOU. To limit post-removal recontamination of bed and bank sediments, long-term success is dependent on the construction and effective implementation of the alternative remedial strategy to limit transport of contaminated sediments for wet weather flows described in Section 8.2. For evaluation, the above elements are discussed further in the following sections.

In addition to the actions described above, all other ROD requirements for base and normal high flow conditions are retained, including but not limited to contingency measures if the remedial actions are not fully protective and compliant. Surface water monitoring is also retained and important for remedial implementation.

8.1.2 Comparison to Remedy Selection Criteria

The selected remedy for base and normal high flow conditions within the BPSOU and the alternative remedy presented above (which is within the scope of the selected remedy) are similar. To ensure that any change to the ROD involved with the current remedial activities for surface water remains consistent and compliant with CERCLA and its regulations, a reanalysis of the application of the nine remedy selection criteria for these actions has been conducted in the following sections. The nine criteria analysis will also be presented in a proposed plan for a ROD amendment.

In accordance with the NCP (40 CFR Part 300), the performance of the alternative remedy described above is evaluated using the NCP's nine criteria (Section 300.430(e)(9)(iii)) as a basis for comparison. The evaluation determines which alternative meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs (unless a waiver is justified), provides the "best balance" with respect to the five balancing criteria of 40 CFR Section 300.400(e)(iii)(C)-(G), and takes into consideration state and community acceptance.

8.1.3 Threshold Criteria

8.1.3.1 Overall Protection of Human Health and the Environment

The alternative strategy for base flow and normal high flow does not alter the achievement of overall protection of human health and the environment as concluded in the ROD. The removal of contaminated sediments, stream banks, and nearby floodplain wastes was included in all the alternatives considered for the selected remedy in the ROD (except the no action alternative) and is an established cleanup component. This remedial component is likely to be expanded during remedy implementation. Although not a Superfund action, the scheduled upgrades to the Metro STP should benefit water quality in SBC downstream of the BPSOU. Long-term monitoring will provide information on the effectiveness of the remedy and substantiate any conclusions drawn regarding protectiveness. Arsenic and iron are derived from upstream sources beyond the BPSOU and outside the influence of the selected remedy and alternative strategy. Therefore, protection of human health with respect to arsenic in surface water will eventually require addressing upstream sources but can be managed with ICs if necessary to prevent surface water domestic use as a drinking water source. Similarly, protection of environmental receptors with respect to iron in surface water will also require addressing upstream sources.

According to the analysis presented in Section 7.1.1.3, the total recoverable chronic aquatic life performance standard for copper and lead during base and normal high flow events would possibly be met through the implementation of the contaminated sediment, stream banks, and nearby floodplain waste removals and additional groundwater capture. However, because there is uncertainty with these two COCs, the alternative remedy proposes contingent surface water ARAR waivers for copper and lead. The replacement performance standards for these contaminants are also protective (they are the EPA Clean Water Act Section 304(a) national

criteria recommendations); thus, the alternative remedial strategy remains protective of human health and the environment.

8.1.3.2 Compliance with ARARs or Appropriate Waived-to Performance Standards

To avoid the influence of the Metro STP outfall at station SS-07, compliance with ARARs is evaluated from station SS-06G, just upstream of the BPSOU boundary. This is discussed further in Section 7. For samples collected at station SS-06G during base flow conditions from 2008 through 2013, several exceedances of performance standards occurred for copper; however, no exceedances occurred post-July 2011 after the remediation of the BRW seep. The only other base flow exceedances for metals in the 2008 through 2013 time frame were one each for iron and lead.

For samples collected at station SS-06G during normal high flow conditions from 2008 through 2013, exceedances of water quality standards occurred for copper, arsenic, and iron. No or few exceedances (less than one in 3 years) of performance standards occurred for aluminum, cadmium, zinc, and silver. Lead exceedances were related to possible outliers.

As discussed in Section 7.1, removal of contaminated sediment, stream banks, and nearby floodplain wastes will potentially be successful in achieving compliance with the ARAR for copper at station SS-06G. Although not a Superfund action, the change in operations and treatment plant upgrade at the Metro STP are predicted to result in only one or two exceedances per 3 years for copper at station SS-07, a significant improvement, although possibly greater than the allowable one per 3 years. If, after implementation of technically practicable remedial measures addressing base and normal high flow conditions, the total recoverable copper and/or lead performance standards for chronic conditions are not met in the reach above SS-06G, a waiver to the alternative and protective current federal AWQC is appropriate and will be applied.

Exceedances of the ARARs for arsenic and iron can be expected until sources upstream outside of the BPSOU are addressed; thus, it is presently technically impractical to meet the arsenic and iron ARARs within BPSOU without use of the upstream allowance methodology. Future actions may address the upstream inputs of arsenic and iron. Therefore, the alternative remedial strategy is protective of human health and the environment in the long term.

8.1.4 Primary Balancing Criteria

8.1.4.1 Long-term Effectiveness and Permanence

The remedy for base and normal high flow conditions involves the removal of sources from within the stream and along its banks and floodplain. The removal of contaminated sediment, stream banks, and nearby floodplain waste was a standard element of all the alternatives considered (except no action) in the ROD and is part of the ROD's selected remedy. Thus, full implementation of the ROD requirements, with the minor alternatives described here, will potentially provide long-term effectiveness and protection. Importantly, the long-term effectiveness and permanence of the remedy relies on the effective implementation of the wet weather components of the remedy to limit recontamination by sediments carried in stormwater. Furthermore, long-term operations and maintenance of the stormwater basins and other CERCLA stormwater remedy components, plus municipal stormwater infrastructure maintenance, will be critical to the success of the remedy.

8.1.4.2 Reduction in Toxicity, Mobility, or Volume through Treatment

The physical removal of bed, bank, and floodplain sediment materials will result in a reduction in toxicity and mobility of mining wastes by removing them from the in-stream or near-stream environment, but volume of those materials would not change because no treatment would be applied. Little or no treatment of the mining wastes will occur as part of the remedy because they are removed from one location to another. In the ROD, active treatment was screened out as a potential option for solid media. Just as the originally selected remedy satisfied this criterion, the alternative remedial strategy presented here will also satisfy this criterion.

8.1.4.3 Short-term Effectiveness

The most likely method proposed for the removal of bed sediments would include isolating surface waters into half of the channel and removing the bed sediment in a partially dewatered environment. It is assumed this method would be used, for ease of implementation, on relatively short sections, which should help alleviate environmental impacts. However, there is a possibility of short-term, adverse impacts on water quality within the BPSOU due to the need to work within the stream bed and banks. Once complete, adverse impacts to water quality presumably will only occur during restabilization, during the first one to two normal high flow events, with evidence of reductions in loading expected to occur within a short period thereafter.

As stated in the ROD, construction activities will be performed with standard equipment such as excavators and trucks. This type and scale of construction has been implemented on several occasions in the BPSOU and poses low risks to workers and the community. Other risks, such as those from dust emissions and stormwater runoff during construction, can reasonably be mitigated and thus pose low risks. Just as the originally selected remedy satisfied this criterion, the alternative remedial strategy presented here will also satisfy this criterion.

8.1.4.4 Implementability

The remedial action involves commonly exercised construction and sediment and floodplain removal activities that are readily implementable. No difficult or unreliable methods are proposed that would potentially cause extended delays or hamper the ability to undertake the methods altogether. Waiver of ARARs and establishment of ICs are readily implementable. Accordingly, this remedial strategy for base and normal high flow surface water control has a high level of implementability.

8.1.4.5 Cost

The cost of implementing the technologies in the proposed remedy for base and normal high flow events is provided in Appendix G. Sediment removal in the ROD, as part of the selected remedy, included the “slag canyon and upper reaches of SBC.” This concept has been further refined to include additional volume for removal along Blacktail Creek adjacent to the Blacktail Berm and Visitor’s Center, with corresponding added costs to those shown in the ROD. Given the anticipated effectiveness of the removals in the alternative remedy, the added cost is not excessive.

8.1.5 Modifying Criteria

8.1.5.1 State Acceptance

The state concurs with the proposed alternative remedial strategy presented.

8.1.5.2 Community Acceptance

Community acceptance of the proposed remedial strategy will be further evaluated following the provision and review of the proposed plan for a ROD amendment.

8.2 Wet Weather Flow

8.2.1 Alternative Remedial Strategy Components

The selected remedy for wet weather flow, as described in the 2006 ROD, included the Surface Water Management Program. This is an iterative process of implementation of stormwater BMPs and diagnostic monitoring to address COC sources during runoff events from the BPSOU. In Section 7, various TEs (consisting of stormwater BMPs), including several combined individual TEs, were evaluated to predict potential improvements to stormwater quality within the BPSOU. Based on modeling results, the construction and operation of stormwater basins at both Buffalo Gulch and upper SBC, along with stormwater controls in other uncontrolled areas within BPSOU, would be the most effective and practicable approach to reduce in-stream COC concentrations during wet weather events.

As discussed in Section 7.2, although the stormwater basins will improve water quality in SBC during wet weather flow, the stochastic modeling indicates total recoverable copper and zinc are unlikely to meet acute water quality performance standards (i.e., DEQ-7 standards) during most wet weather flow conditions regardless of the measures implemented to control the COCs, except for treating all stormwater at a conventional water treatment plant, which is impracticable at the BPSOU site. Therefore, along with implementation of the selected remedy, the alternative remedial strategy for wet weather flow incorporates a waiver of the DEQ-7 acute water quality performance standards for total recoverable copper and zinc as follows:

- ARAR waivers – Waiver of the State of Montana acute aquatic standards for total recoverable copper and zinc is warranted at the site as achievement of those standards is technically impracticable. The waived performance standards will be replaced by the 1996 federal AWQC freshwater criterion maximum concentration (CMC) for copper and zinc within the BPSOU (hardness-based dissolved standard). The waived-to performance standards for copper and zinc use the same MDEQ-7 numerical standards, except that a dissolved conversion factor is applied to the total recoverable numeric standards, the analysis is for dissolved metals, and there is no minimum or maximum value for hardness. The 2006 ROD identified the federal AWQC as applicable and protective under the Clean Water Act, and they are therefore considered suitable and protective replacement performance standards.

  If after implementation of technically practicable remedial measures to address wet weather flow and a period of monitoring, the dissolved CMC standards for copper and zinc are not met, further waivers to the current federal AWQC may be needed. For copper, this would include a waiver to the BLM criterion. Due to the time needed to implement the alternative remedial strategy and monitoring, the AWQC may have changed. Therefore, the waved to performance standard for copper would be the criterion in place at the time of compliance determination modified for use in acute conditions. For zinc, this would include a waiver to the applicable federal criterion at the time of compliance determination.

- Upstream allowance – This component recognizes that water quality upstream of the BPSOU does not consistently meet aquatic performance standards during wet weather events, resulting in exceedances as the water flows through the BPSOU. The upstream allowance is a method to account for upstream influences on water quality within the BPSOU. The principle of the method is that surface water exiting the site must not have higher concentrations of COCs than water entering the site. Details of the method will be included in the BPSOU Consent Decree. The 2006 BPSOU ROD provided for consideration of this type of methodology. It is a methodology also used at other operable units within the Clark Fork Basin Superfund sites.

The stochastic modeling evaluation in Section 7 for TE 9 shows a considerable decrease in COC concentrations, specifically for lead, silver, and cadmium when bioretention basins are constructed at both Buffalo Gulch and upper SBC (Table 7-21 – high removal efficiency with upstream allowance). Other TEs show similar effectiveness for stormwater basins of a similar nature. For lead, silver, and cadmium, the predicted concentrations from the stochastic modeling are within the range of uncertainty of being low enough to meet the existing performance standards, allowing one in 3-year ARAR exceedance criteria. Even if a low removal efficiency of 10 percent is assumed for TE 9, considerable concentration decreases occur for these COCs. Because of this, an up-front waiver of the DEQ-7 total recoverable acute aquatic life criteria for lead, silver, and cadmium is not warranted at this time. If after effective implementation of the remedy and technically practicable BMPs, monitoring indicates that the total recoverable lead, silver, and cadmium performance standards are not met, waiver to the current federal AWQC CMC (hardness-based dissolved standards) for lead, silver, and cadmium identified in the ROD will be applied. The federal AWQC CMC standards for lead, silver, and cadmium use the same Montana DEQ-7 numerical standards except that a dissolved conversion factor is applied to the total recoverable numeric standards, the analysis is for dissolved metals, and there is no minimum or maximum value for hardness.

All other ROD requirements for wet weather flow conditions are retained, with the exception of the construction of a separate, stormwater treatment plant which is viewed as technically practicable in the BPSOU setting. Surface water monitoring is also retained and is important for remedial implementation.

8.2.2 Comparison to Remedy Selection Criteria

The existing selected remedy for wet weather conditions at the BPSOU and the alternative remedy presented above (which is consistent with and within the scope of the engineering elements of the selected remedy) are similar. To ensure that any change involved with the current remedial activities for surface water remains consistent and compliant with CERCLA and its regulations, a re-analysis of the application of the nine remedy selection criteria for the alternative remedial action described above has been undertaken in the following sections.

In accordance with the NCP (40 CFR Part 300), the performance of the alternative remedy described above is evaluated using the nine criteria (Section 300.430(e)(9)(iii) of the NCP). The evaluation determines whether the alternative: (a) meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs (unless a waiver is justified), (b) provides the "best balance" with respect to the five balancing criteria of 40 CFR

Section 300.400(e)(iii)(C) (G), and (c) takes into consideration the acceptance of the state and the community.

8.2.3 Threshold Criteria

8.2.3.1 Overall Protection of Human Health and the Environment

The selected remedy defined in the ROD and modified by the alternative remedial strategy is expected to be protective of human health and the environment based on attainment of existing acute aquatic surface water performance standards for aluminum, arsenic, and mercury, the expected attainment of acute aquatic surface water performance standards for cadmium, lead and silver; and the protectiveness of possible replacement performance standards for cadmium, lead and silver identified here. As for copper and zinc, based on the results of various analyses detailed within Section 7.2, it is clear total recoverable copper and zinc are unlikely to meet acute water quality performance standards (i.e., DEQ-7 standards) during most wet weather flow conditions, regardless of the BMP measures implemented to control the COCs. However, in comparison to existing conditions, where concentrations have exceeded performance standards by orders of magnitude, the in-stream COC concentrations are predicted to considerably decrease following the implementation of the alternative remedial strategy such that alternative and protective ARAR performance standards can be met in wet weather conditions. Likewise, removal of contaminated sediment, stream banks, and nearby floodplain wastes and associated wet weather flow pathways will eliminate a primary source (i.e., contaminated sediment).

The replacement performance standards that are part of the alternative remedial strategy are considered protective. As described above, the 2006 ROD identified the AWQC as applicable and protective under the Clean Water Act and specifically identified them as replacement performance standards in the event state standards are waived. The alternative remedial strategy uses a combination of AWQC identified in the ROD and AWQC subsequently identified by EPA under the Clean Water Act. Modeling did not evaluate the TEs for efficacy at removal of dissolved COCs, therefore, attainment of the waived-to performance standards for copper and zinc is uncertain. It is important to fully implement the TEs and additional practices identified in Section 8.2.1, including monitoring of surface water quality to maximize the probability of attaining the waived-to performance standards for copper and zinc. Periodic review will evaluate if the alternative remedial strategy is protective and meets performance standards. If not, additional actions will be needed.

If the alternative remedial strategy is successful in meeting the acute ARAR standards, including the up-front copper and zinc waived-to federal AWQC standards, this will be considered protective of the environment. This is expected if the technically practicable BMPs are fully implemented. There is uncertainty associated with the modeling and predictive analysis presented in Section 7. If these waived-to performance standards are not met after implementation of the alternative remedial strategy, additional waivers for copper, cadmium, lead, silver, and zinc are appropriate and will be applied.

8.2.3.2 Compliance with ARARs or Appropriate Waived-to Performance Standards

As discussed in the previous section, surface water is not expected to meet DEQ-7 standards for total recoverable copper or zinc consistently during wet weather conditions under any TE scenario evaluated. The stochastic model simulations indicate the remedy will likely decrease the

magnitude and duration of exceedances during wet weather flows for total recoverable copper and zinc; however, they will not be eliminated. Thus, it is presently technically impractical to meet the total recoverable copper and zinc ARARs within BPSOU during wet weather conditions. With successful implementation of the remedy and the waivers as part of the alternative remedial strategy, the federal AWQC CMC hardness-based dissolved performance standards for copper and zinc, identified in the ROD, could potentially be met. As noted above, this was not modeled, and success is uncertain. If the waived-to performance standards for copper and zinc are not met, further waivers to the current federal AWQC may be needed. For copper, this would include a waiver to the BLM criterion, modified for use in acute conditions. For zinc, this would include a waiver to the applicable federal criterion at the time of compliance determination.

Conversely, lead, silver, and cadmium concentrations will considerably decrease with the remedy and should remain within or close to the MDEQ-7 total recoverable standards. If after effective implementation of the remedy, monitoring indicates that the total recoverable lead, silver, and cadmium performance standards are not met, waiver to the federal AWQC CMC will be applied for these COCs (hardness-based dissolved performance standards).

8.2.4 Primary Balancing Criteria

8.2.4.1 Long-term Effectiveness and Permanence

The selected remedy (including construction of stormwater basins and other BMPs) is expected to be an effective measure for capturing and removing contaminated sediment, with appropriate maintenance. However, under conditions where the basin design capacities are exceeded, untreated stormwater containing COCs and suspended sediment will be discharged to surface water, which has the potential to cause recontamination of the bed sediments. Recontamination from stormwater sources may reduce the long-term effectiveness of the base and normal high flow alternative remedy. It is likely that the magnitude of recontamination will not match the current contamination in the bed sediments. Additionally, during the period between recontamination events, the sediment may mix with less contaminated sediment from upstream, resulting in lower metals concentrations than current conditions. Although recontamination reduces the effectiveness of the bed sediment removal, the resulting long-term effectiveness and permanence would be a notable overall improvement in current conditions. The alternative remedial strategy for wet weather flows can be expected to provide long-term protection. However, long-term operations and maintenance of the stormwater basins and other BMPs will be critical to the success and permanence of the remedy.

Based on an investigation in the SSTOU, it may be possible under certain conditions for contaminated groundwater to interact with sediment and generate contaminated sediment. Post-RA surface water and sediment monitoring should consider this mechanism for sediment recontamination and evaluate its occurrence and possible remedial actions to address this mechanism. The continued and improved groundwater capture that will be implemented will lessen the overall probability of this occurrence.

8.2.4.2 Reduction in Toxicity, Mobility, or Volume through Treatment

The physical removal of sediments in the stormwater basins from surface water will result in a reduction in volume and mobility of mining waste; however, no active treatment of the sediments will occur as part of the selected remedy.

Toxicity, mobility, and the volume of contaminated stormwater are anticipated to be considerably reduced through the implementation of the stormwater basins. As runoff from wet weather and snowmelt events enter into the basins, contaminants will be removed through settling, filtration, or biological and chemical (sorption) to reduce COC concentrations. Maintenance also will be required at some interval for each treatment technology. Further, the basins will reduce peak flow rates from the Butte Hill drainages, mitigating the peak load of contaminated stormwater entering surface water.

8.2.4.3 Short-term Effectiveness

Construction of the stormwater basins and other BMPs will be performed with standard equipment such as excavators and trucks. This type and scale of construction has been implemented on several occasions in the BPSOU and poses low risks to workers and the community. Once completed, the stormwater basins should be effective from the first storm event. Other risks, such as those from dust emissions and stormwater runoff during construction, are also low and readily mitigated.

8.2.4.4 Implementability

The remedy involves commonly exercised remedial actions, including construction of the stormwater basins that are implementable. There are challenges and limitations pertaining to shallow groundwater, flat topography, land ownership, and buried utilities. However, no difficult or unreliable methods are proposed that would preclude the ability to undertake the methods altogether. Accordingly, the remedy for wet weather flow along with the ARAR waivers has a high level of implementability.

8.2.4.5 Cost

The cost of implementing the technologies in the proposed alternative remedy for wet weather flow events is provided in Appendix G. Although the ROD did not identify specific basins as part of the selected remedy, the technology is similar to sediment basins, which were part of all the alternatives (except no action).

8.2.5 Modifying Criteria

8.2.5.1 State Acceptance

The state concurs with the proposed alternative remedial strategy presented.

8.2.5.2 Community Acceptance

Community acceptance of the proposed remedial strategy will be further evaluated following the provision and review of the complete TI evaluation.

8.3 Technical Impracticability Boundaries

The proposed TI zone for those COCs waived in this evaluation includes SBC from the confluence with Blacktail Creek to the BPSOU boundary at the Interstate 15/90 bridge and Blacktail Creek from the confluence with Grove Gulch to the confluence with SBC within the BPSOU boundary. The extent of the areas included in the TI waiver have been calculated by summing the lengths of the waterways, totaling approximately 2.2 miles. The breakdown of each stream length is shown in Table 8-1, and the streams and BPSOU boundary are illustrated in Figure 8-1.

COCs for which waivers are sought include acute aquatic life standards for copper and zinc. Contingency waivers are also sought if needed following implementation of the alternative remedial strategy and a period of monitoring for acute standards for cadmium, copper, lead, and silver and chronic standards for copper and lead.

Table 8-1 Stream Lengths Impacted by TI Zone

Stream	Length
Blacktail Creek	0.5 miles
Silver Bow Creek	1.7 miles
Total	**2.2 miles**

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Section 9

Summary and Conclusions

As a result of historic mining-related activities within the Butte area for over 100 years, the BPSOU contains numerous sources of historic mining wastes, tailings, and contaminated soil as well as severe groundwater contamination in the alluvial aquifer beneath and adjacent to SBC.

The overall remedial goal for surface water is compliance with surface water quality performance standards during all flow regimes in the BPSOU. This TI evaluation has assessed which TEs will be practicable and effective to implement at the site and predicts whether these measures will improve water quality sufficiently to meet in-stream ARARs. If no action were taken, metal-contaminated sediment will continue to discharge almost unabated into SBC, posing ongoing chronic and acute stress to aquatic life.

9.1 Compliance during Base Flow and Normal High Flow

The analysis presented in Section 7.1 concluded that after implementation of the bed-, bank-, and adjacent floodplain-contaminated sediment RAs, the DEQ-7 total recoverable chronic standards for copper and lead may be met during base and normal high flow conditions. Therefore, it is not technically impracticable to meet the chronic aquatic life performance standards for copper and lead. If after implementation of technically practicable remedial measures addressing base flow and normal high flow conditions, the total recoverable copper performance standard and the total recoverable lead performance standard for chronic conditions are not met, a waiver to an alternative and protective chronic copper and lead performance standard will be applied. All other RAOs are expected to be met, with the possible exception of arsenic that exceeds performance standards due to upstream sources. Protection of human health with respect to arsenic in surface water will eventually require addressing upstream sources but can be managed with ICs if necessary to prevent its use as a drinking water source. Protection of environmental receptors with respect to iron in surface water will also require addressing upstream sources. The remaining COCs are in compliance based on data used in this evaluation.

9.2 Compliance during Wet Weather Flow

The analysis presented in Section 7.2 concluded that the construction and operation of stormwater basins at both Buffalo Gulch and upper SBC were determined to be the most effective and practicable TE in reducing in-stream COC concentrations during wet weather conditions. The stormwater basins will improve water quality in SBC during wet weather flow. However, the stochastic modeling indicates total recoverable copper and zinc are unlikely to meet acute aquatic life water quality performance standards (i.e., DEQ-7 standards) during most wet weather flow conditions regardless of the measures implemented to control the COCs. Therefore, in addition to the implementation of the selected remedy, a waiver of the DEQ-7 acute aquatic life water quality performance standards for total recoverable copper and zinc is warranted. The waived performance standards will be replaced by the current recommended federal AWQC freshwater CMC for zinc within the BPSOU (hardness-based dissolved standard) and the recommended federal AWQC for copper, which is the use of the BLM to develop criteria.

The TI analysis results predict the TEs produce a reduction of lead, silver, and cadmium concentrations sufficient (within the range of uncertainty) to meet existing performance standards, indicating a waiver of the DEQ-7 total recoverable acute aquatic life standards for these COCs is not warranted. If after effective implementation of the remedy and technically practicable BMPs, monitoring indicates that the total recoverable lead, silver, and cadmium performance standards are not met, waiver to the current recommended federal AWQC CMC will be applied for these COCs.

9.3 Conclusions

Based on the analysis presented in this TI evaluation, the remedial actions identified in the alternative remedial strategy are expected to reduce the scale of exceedances of the acute aquatic life performance standard for copper from the current orders of magnitude to within a few parts per billion of the performance standard. Additionally, the actions in the alternative remedial strategy are anticipated to result in meeting chronic aquatic life performance standards in surface water at the site. The alternative remedial strategy is consistent with the selected remedy at the site and is expected to meet RAOs for surface water set forth in the 2006 EPA and MDEQ ROD for BPSOU.

Waivers of acute aquatic life performance standards for copper and zinc are included in the alternative remedial strategy and intended to measure protectiveness of aquatic life following implementation of the alternative remedial strategy. If adopted as recommended by this TI evaluation, this is a modification of the ROD RGs for surface water and needs to be formalized in a decision document.

Section 10
References

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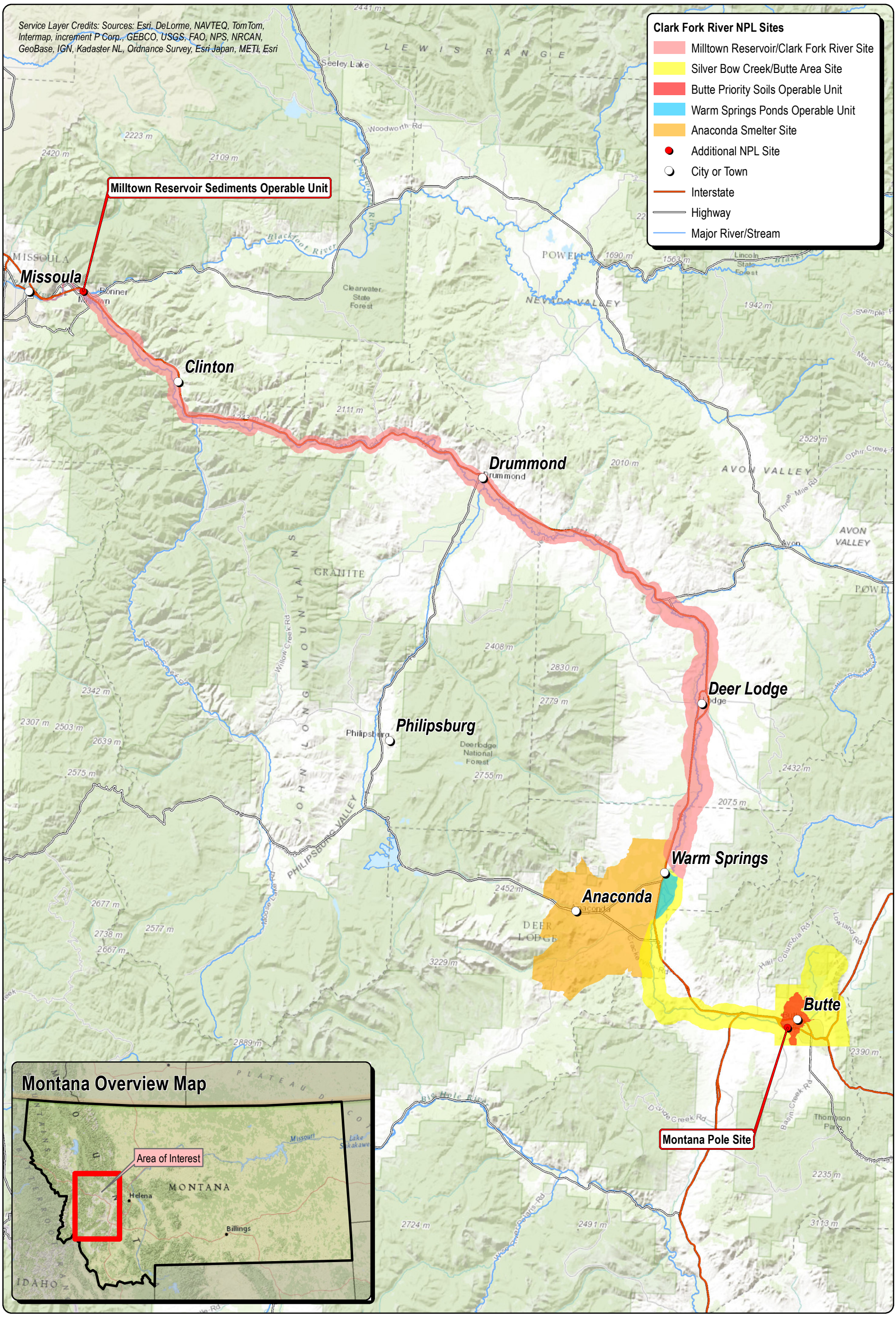

Figure 1-1
Site Location
Surface Water Technical Impracticability Evaluation
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

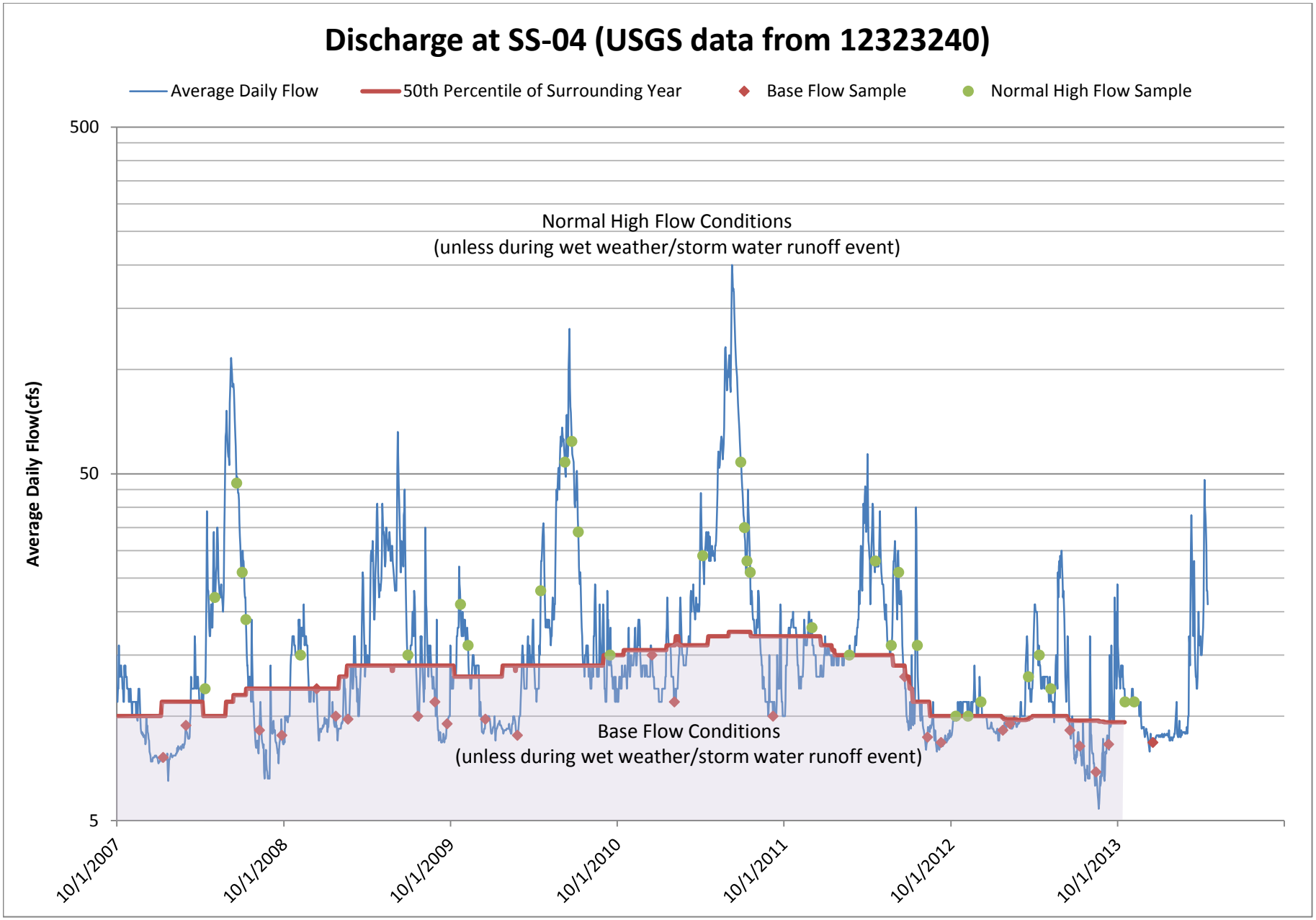

Figure 1-2
Base Flow and Normal High Flow Differentiation

Surface Water Technical Impractibility Evaluation Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

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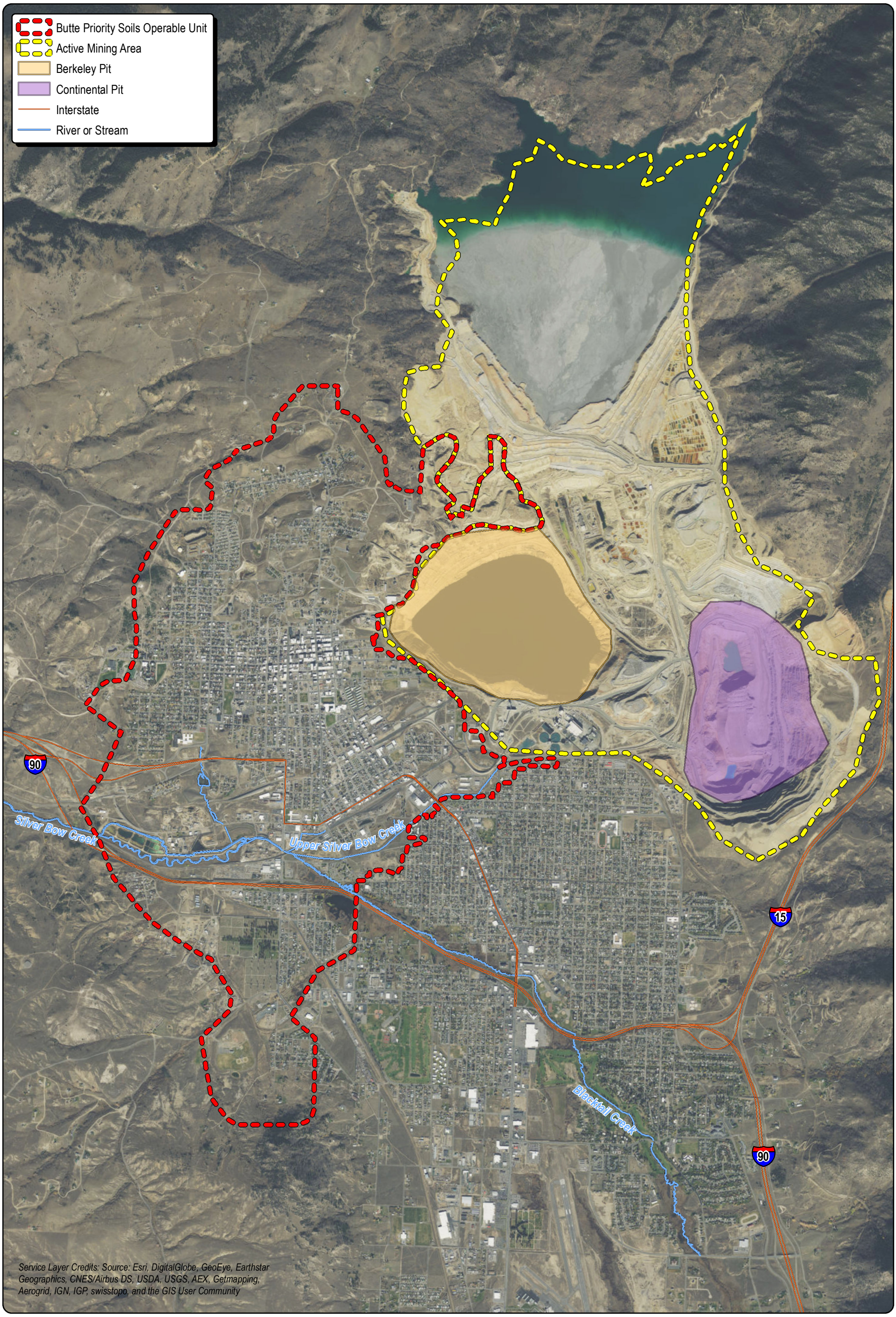

Figure 2-1
Butte Priority Soils OU Site Map
Surface Water Technical Impracticability Evaluation
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

0 0.5 1 1.5 2 Miles

N

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

CDM Smith

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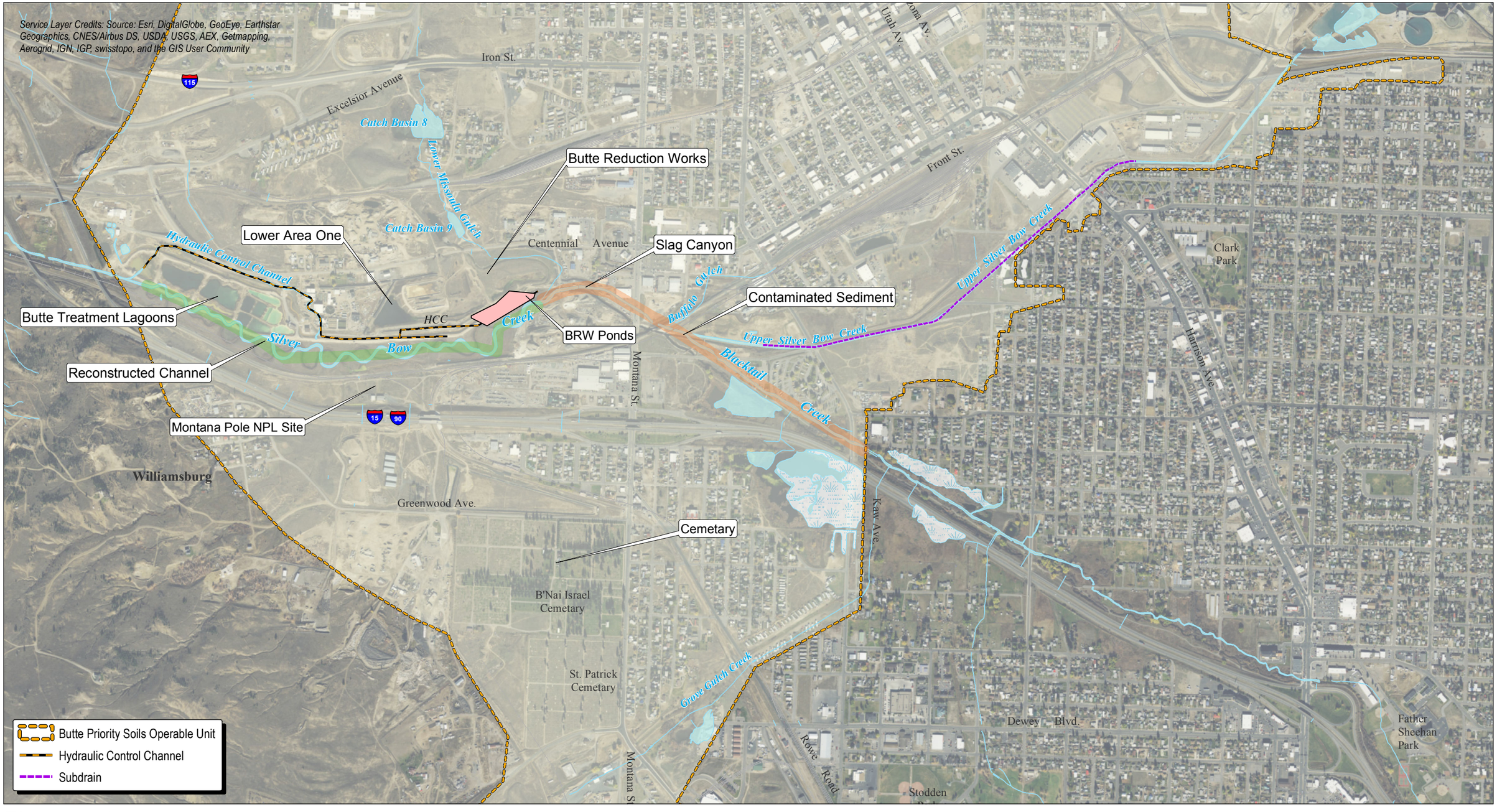

Figure 2-2
Area of Interest
Surface Water Technical Impracticability Evaluation
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

0 1,000 2,000 3,000 Feet

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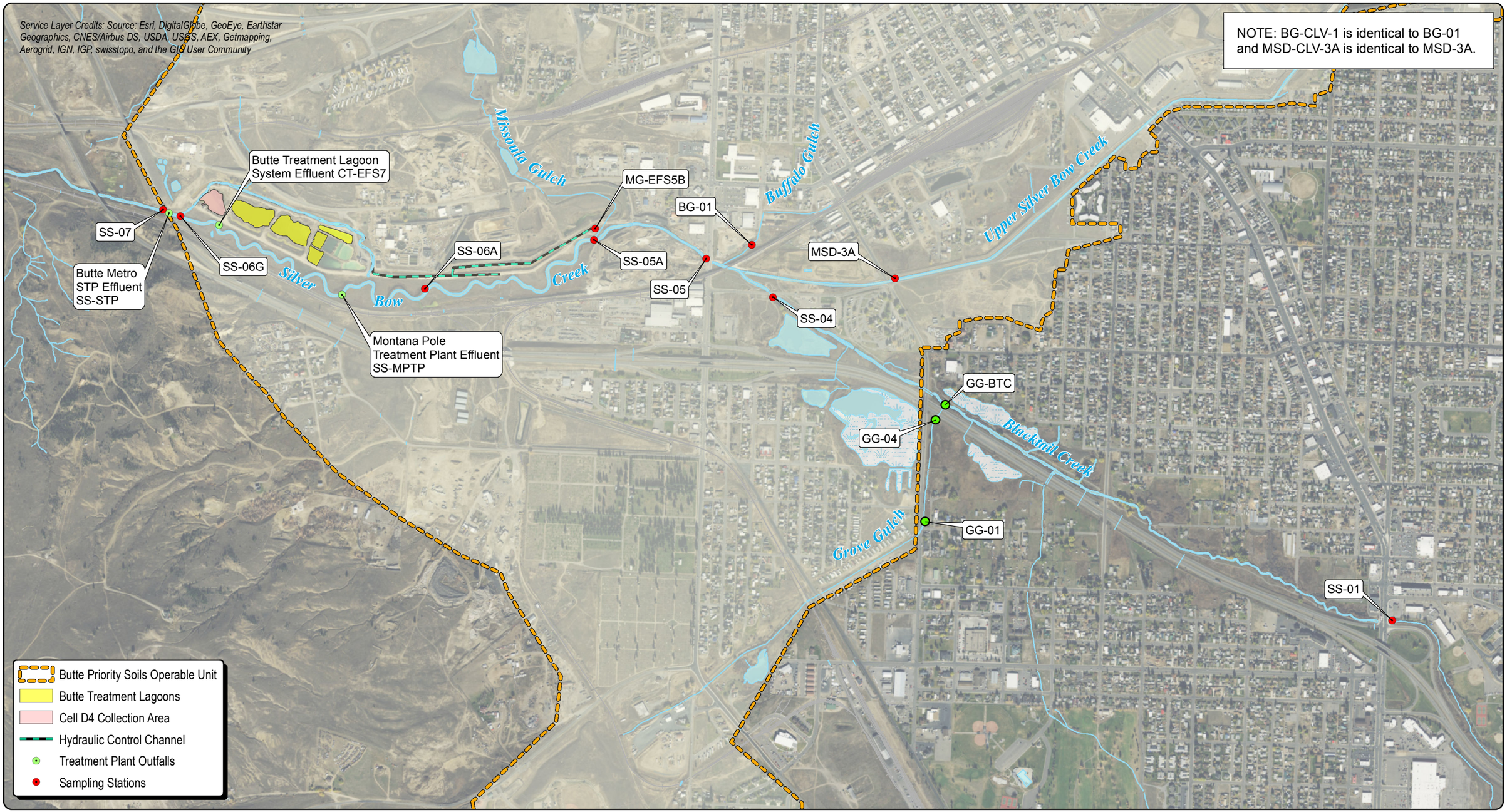

Figure 4-1
Surface Water Compliance Stations
Surface Water Technical Impracticability Evaluation
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

0 1,000 2,000 3,000 Feet

N

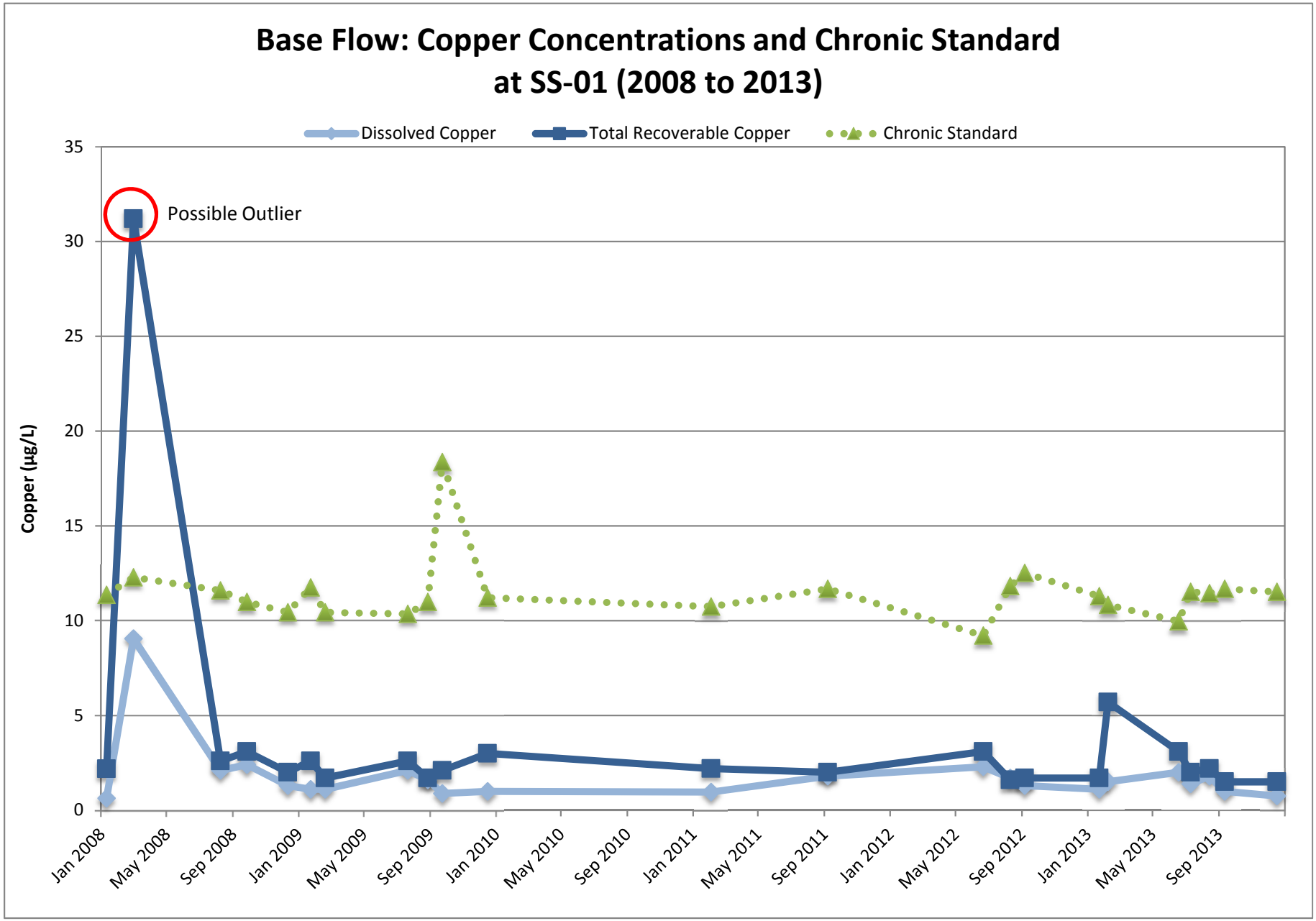

Figure 4-2
Base Flow Copper Concentrations SS-01 - 2008 to 2013

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

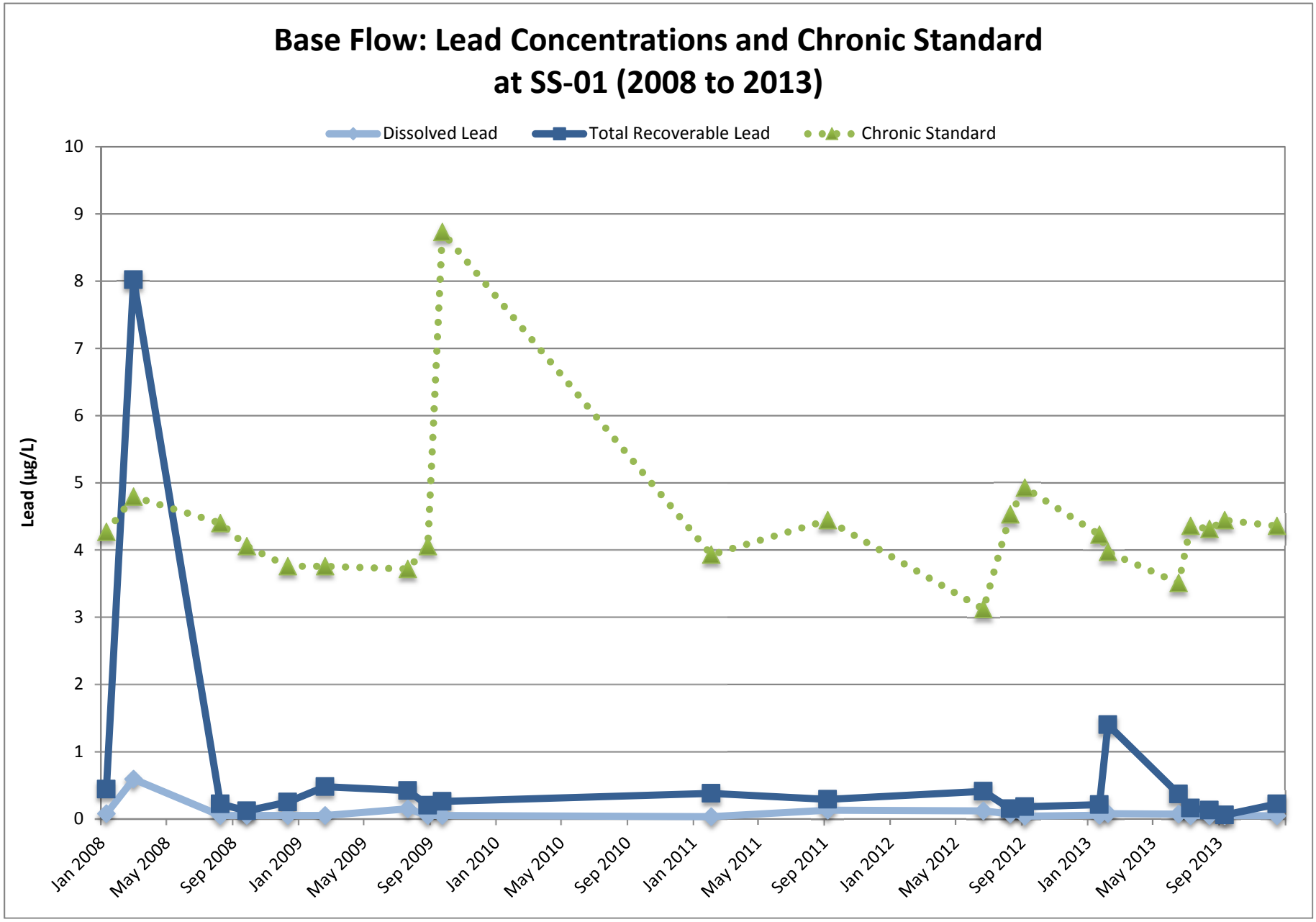

Figure 4-3
Base Flow Lead Concentrations SS-01 - 2008 to 2013

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

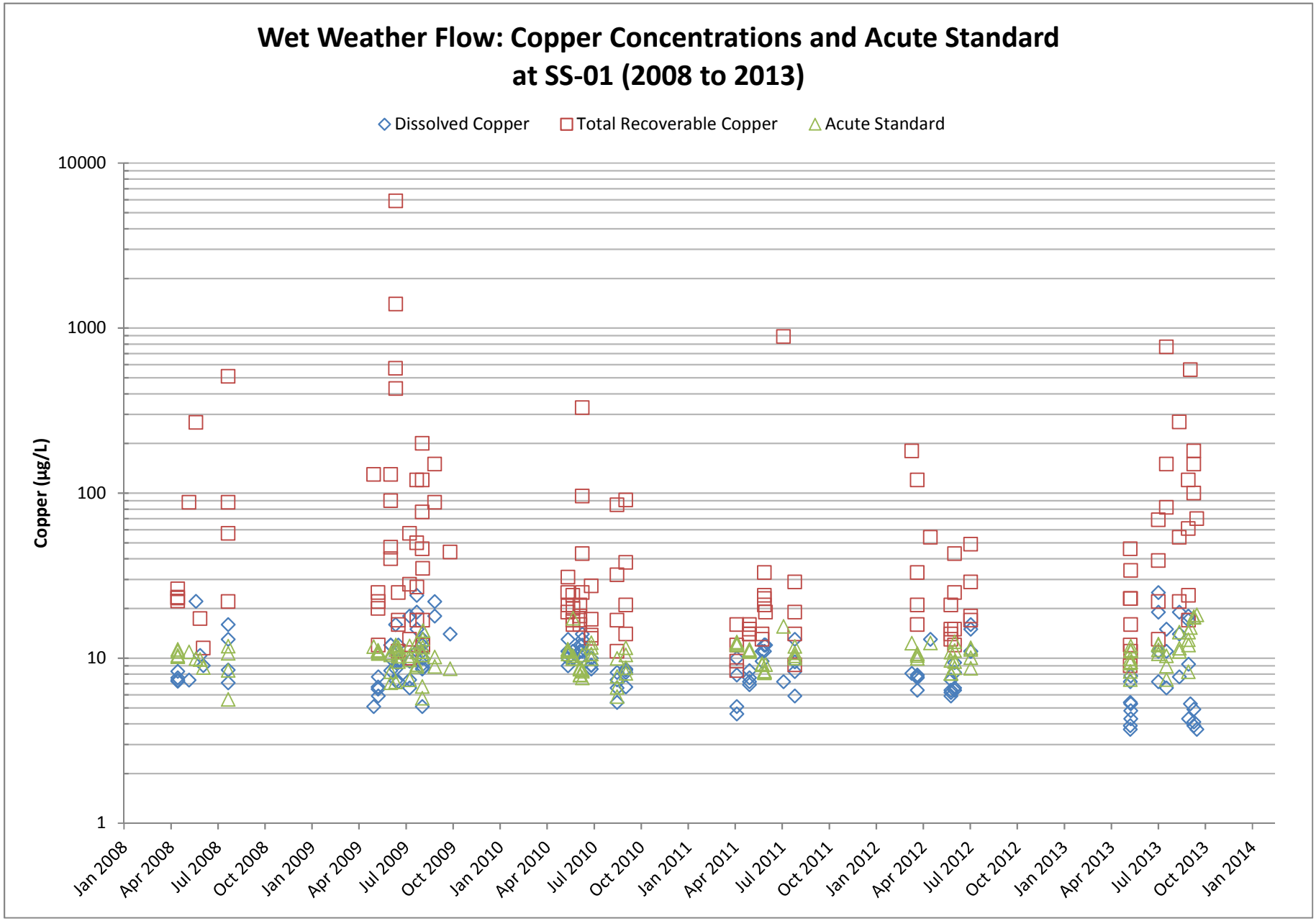

Figure 4-4
Wet Weather Flow Copper Concentrations at SS-01 - 2008 to 2013

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

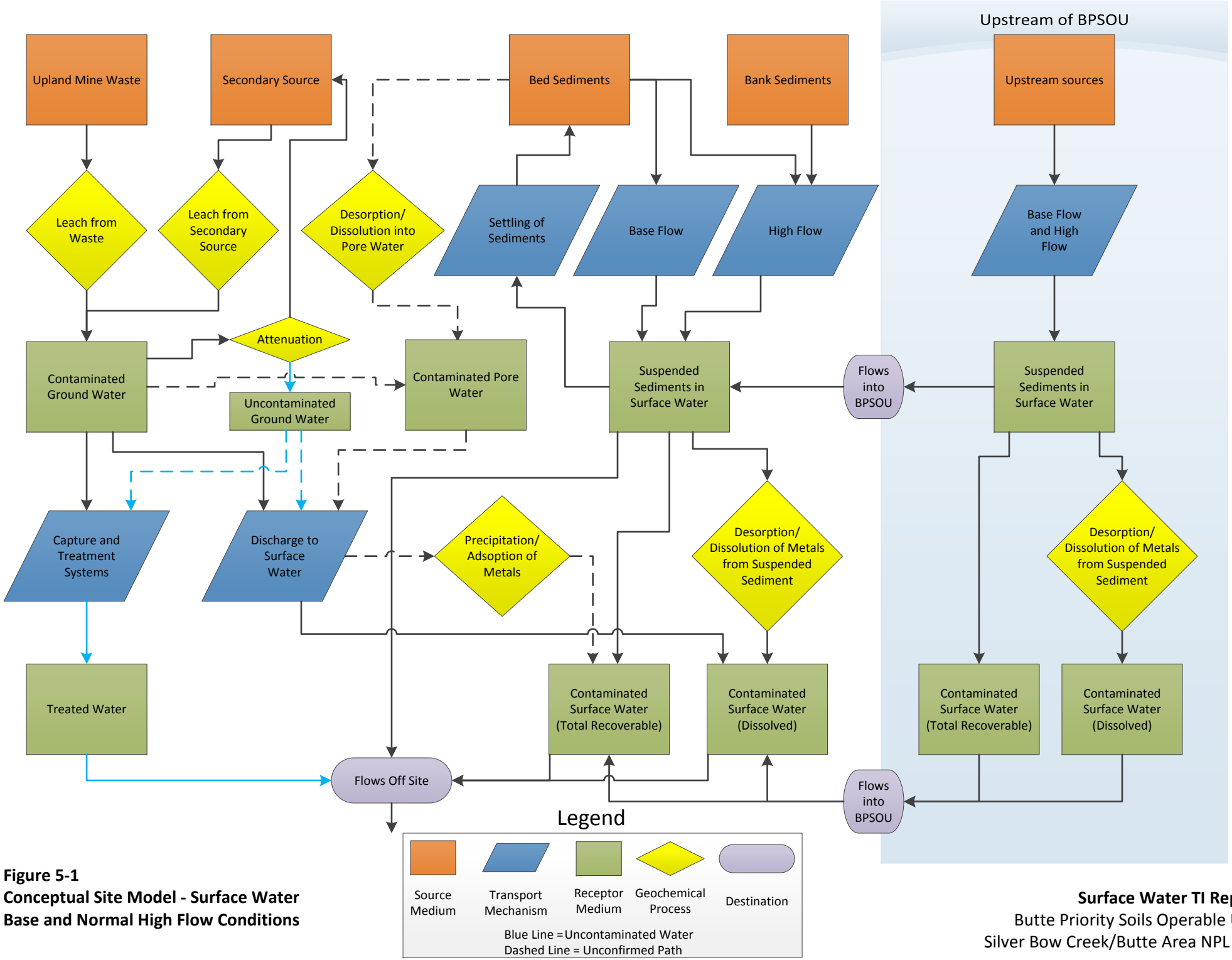

Figure 5-1
Conceptual Site Model - Surface Water
Base and Normal High Flow Conditions

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

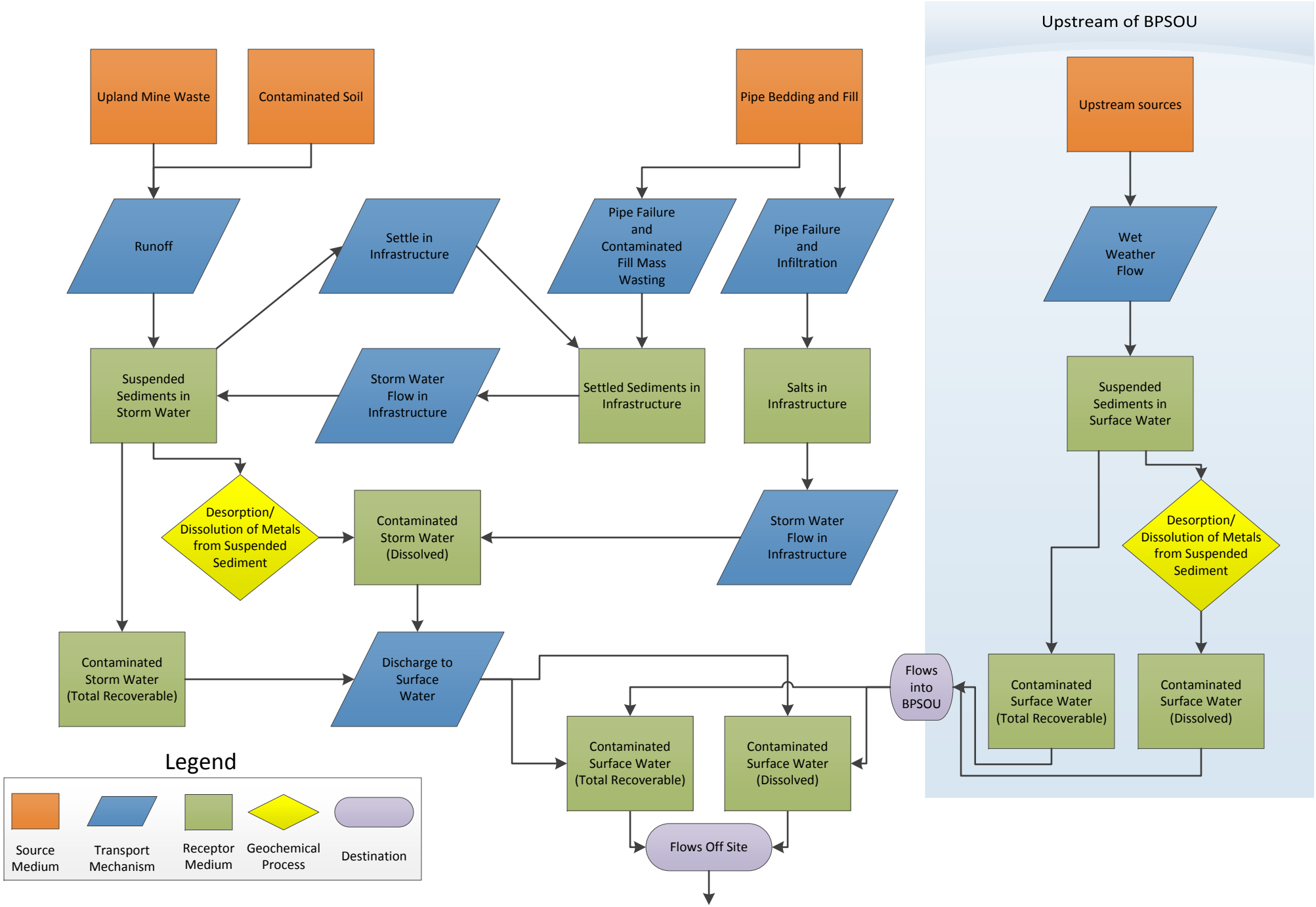

Figure 5-2
Conceptual Site Model - Surface Water
Wet Weather Flow Conditions

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

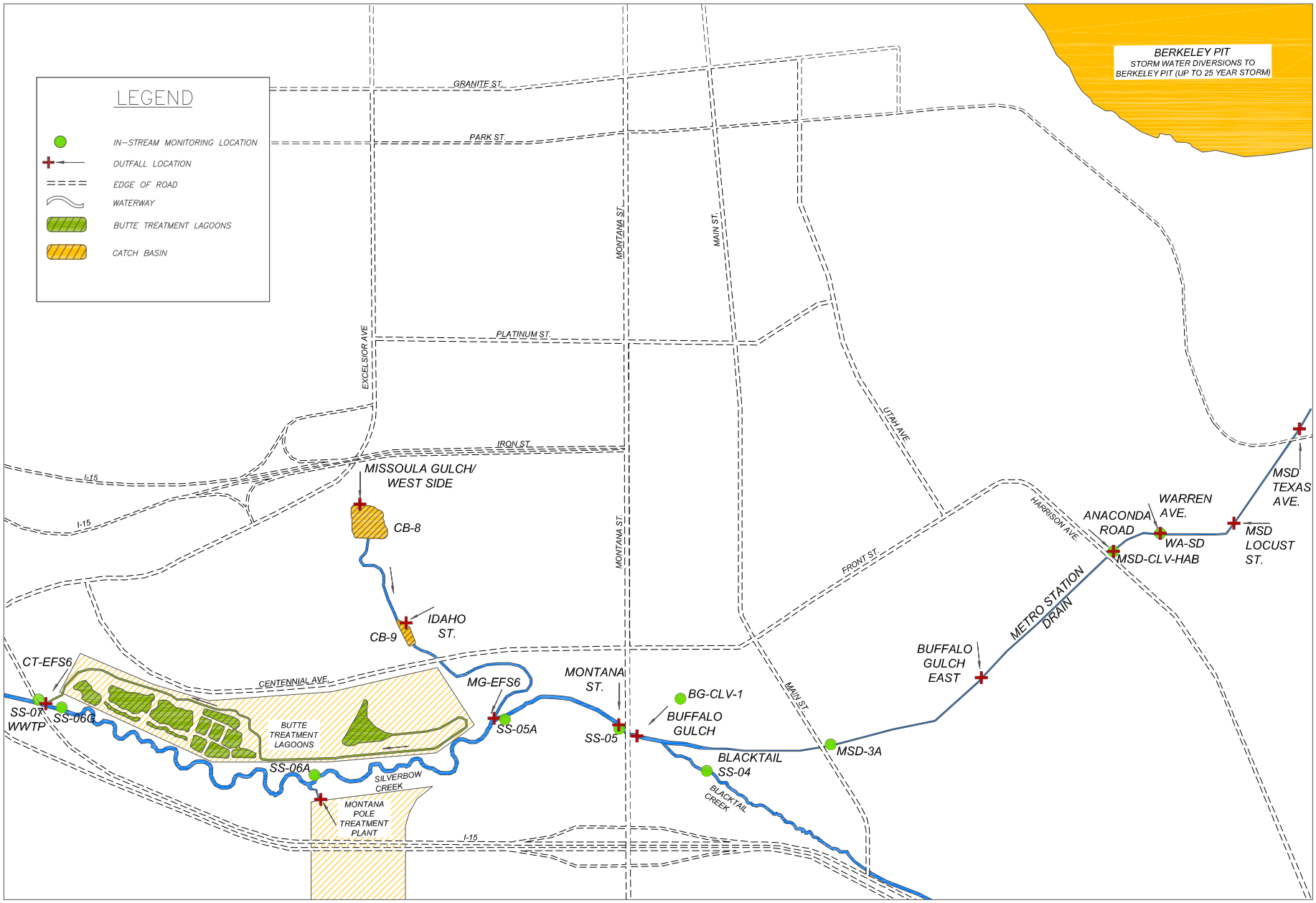

Figure 6-1
Schematic of Surface Water Inputs Used In The 2015 Stochastic Model

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

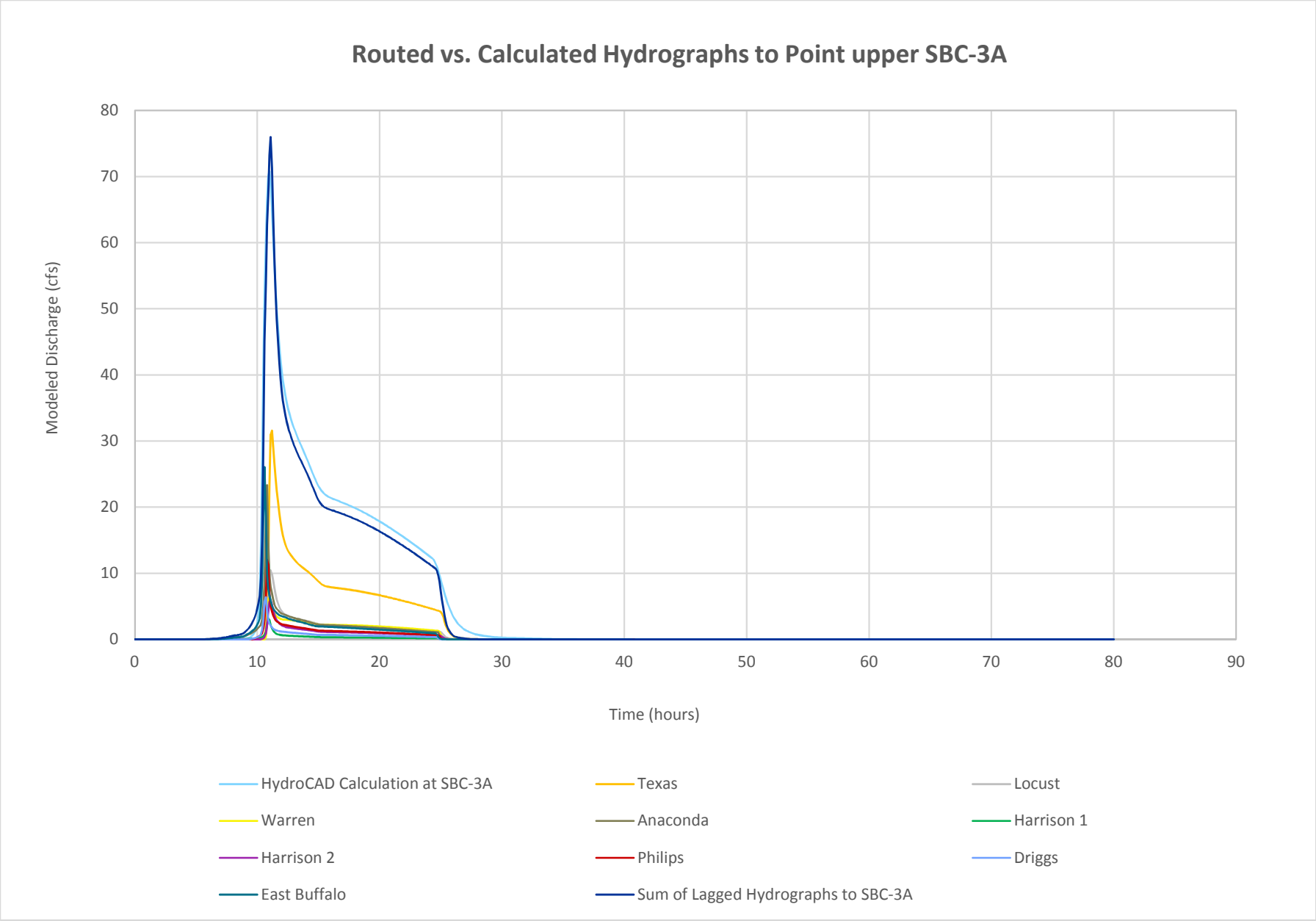

Figure 6-2
Routed vs. Calculated Hydrographs at Point SBC-3A

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

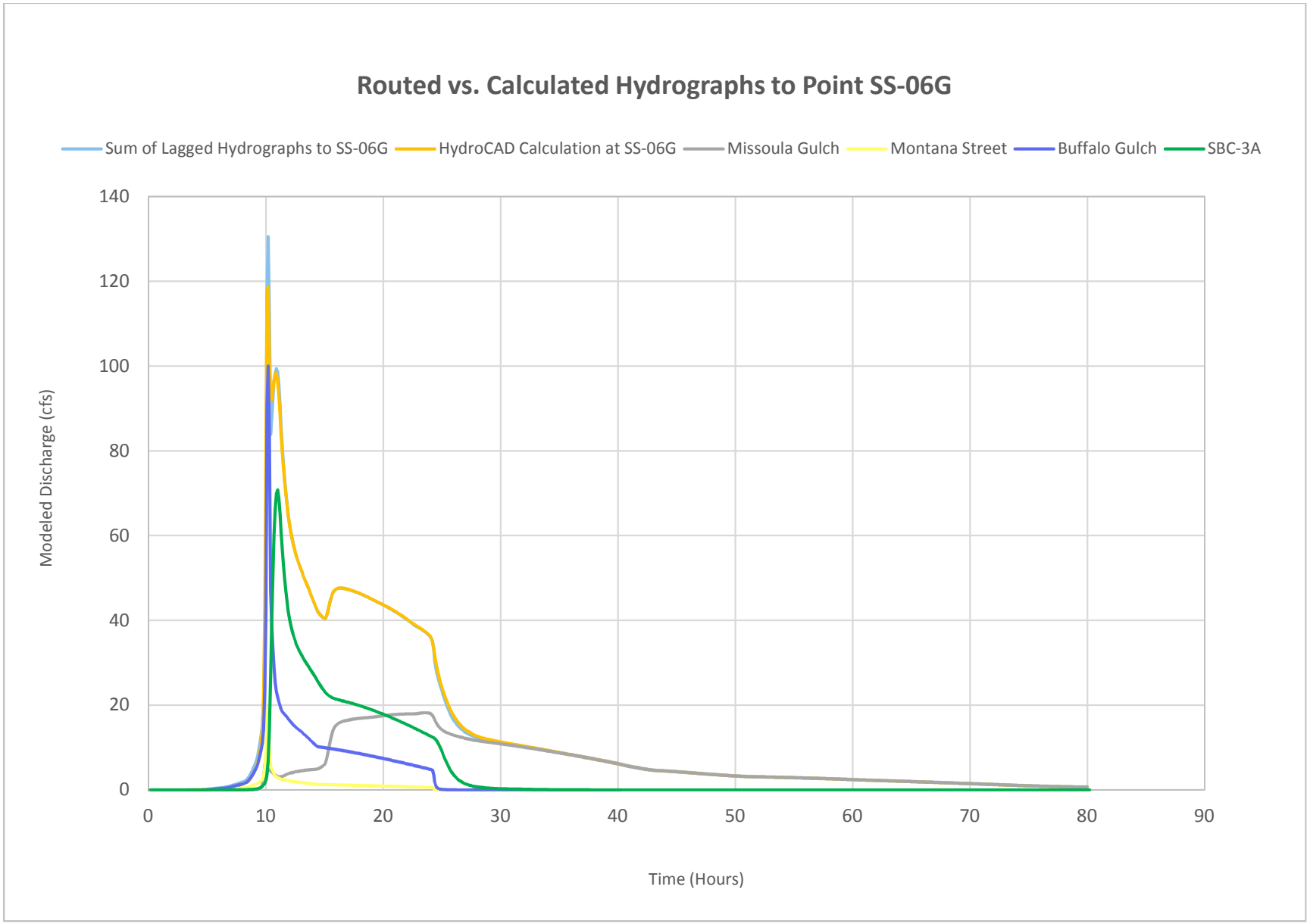

Figure 6-3
Routed vs. Calculated Hydrographs to Point SS-06G

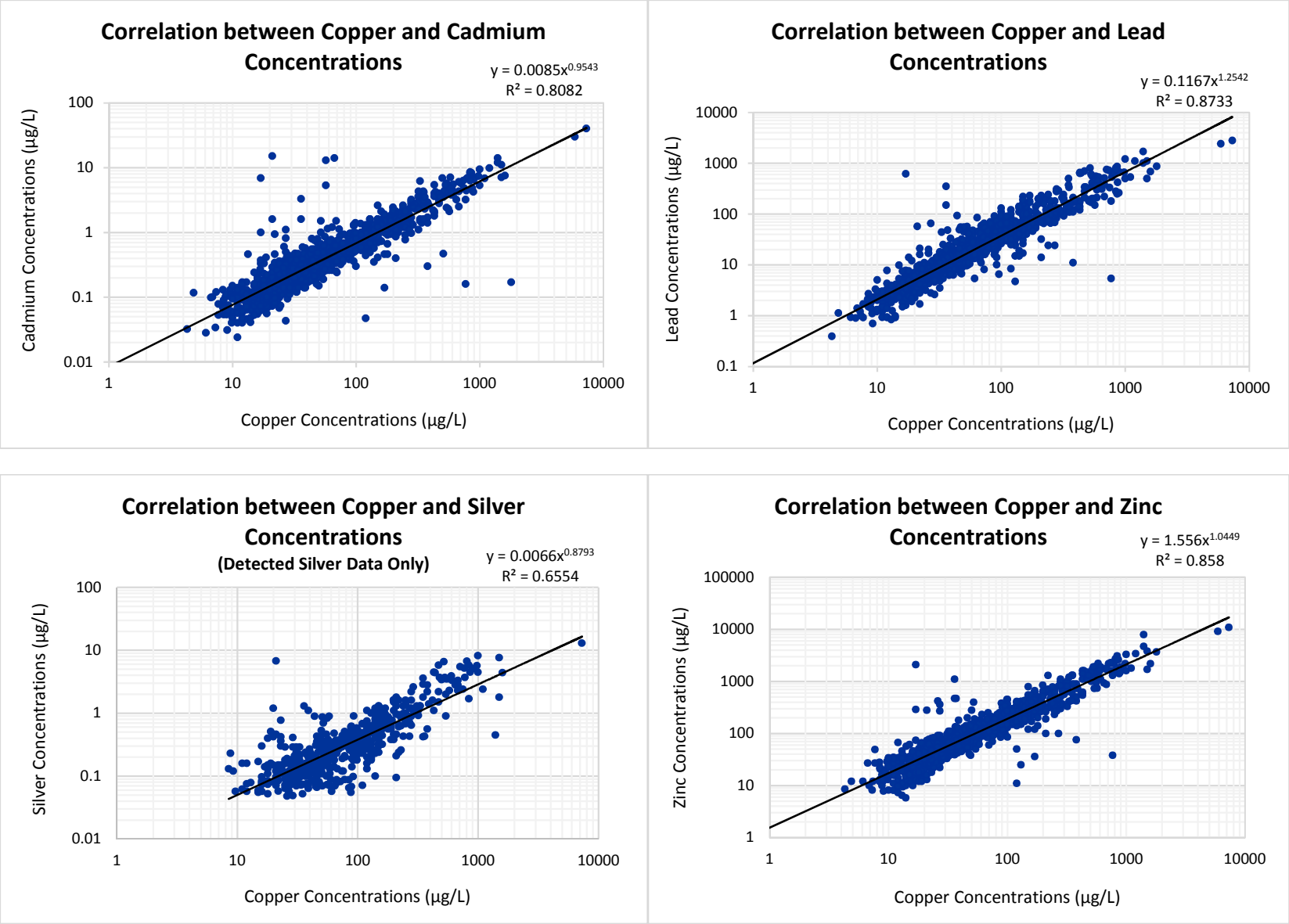

Figure 6-4
Correlations Between Copper and Other COCs Analyzed within the BPSOU

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

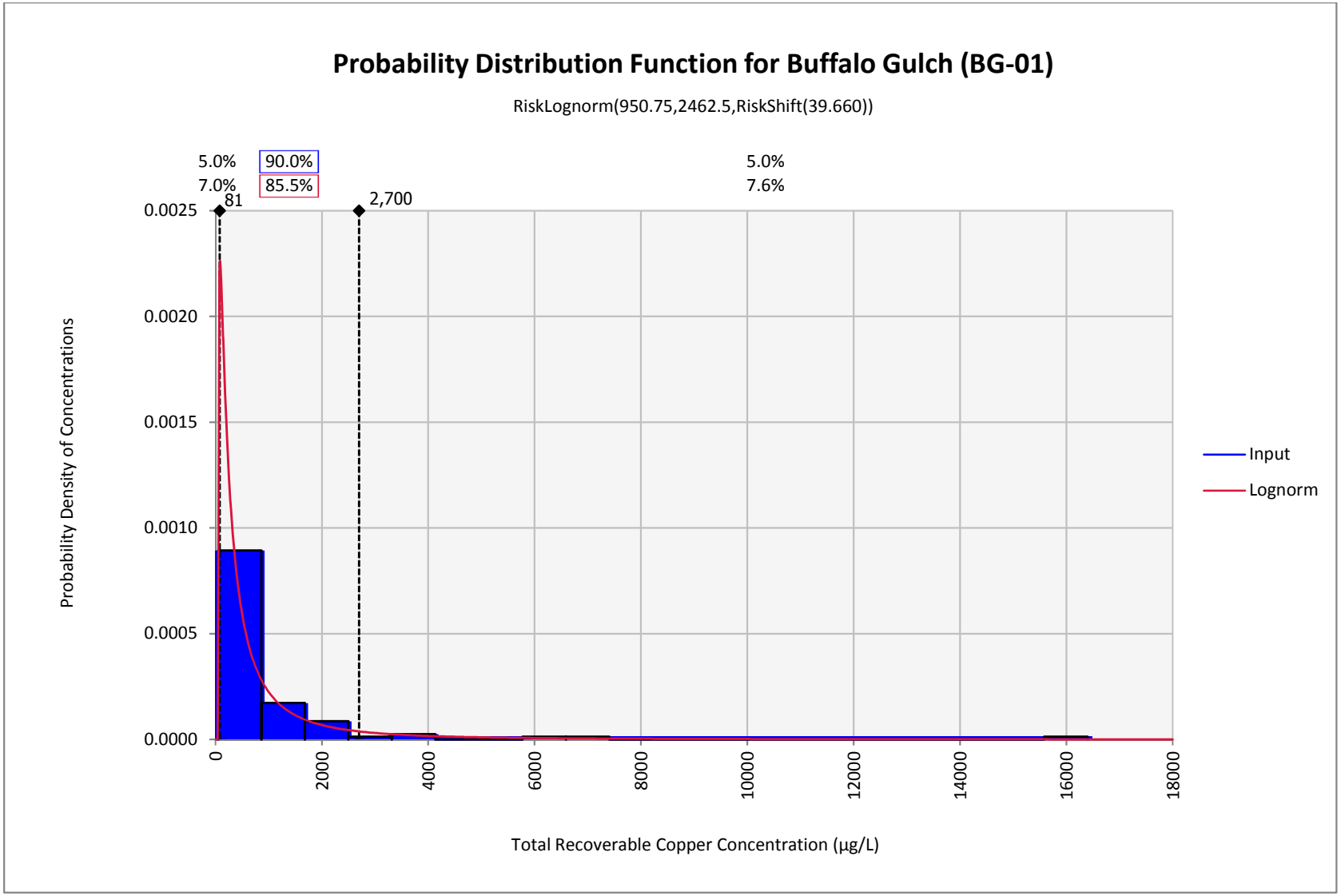

Figure 6-5
Probability Distribution Function for Buffalo Gulch (BG-01)

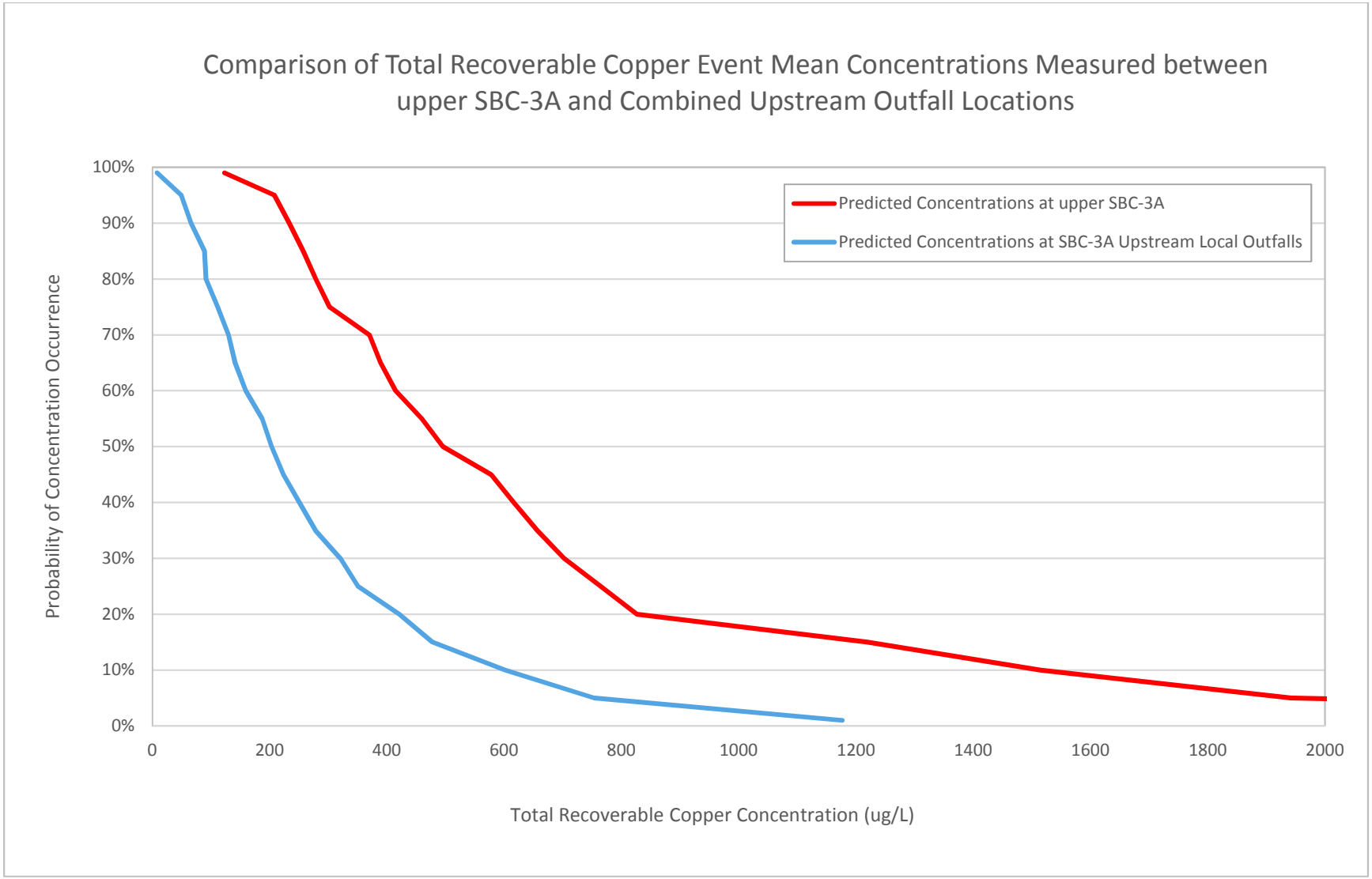

Figure 6-6
Comparison of Total Recoverable Copper Concentrations Measured Between MSD- 3A and the Combined Upstream Outfall Locations

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

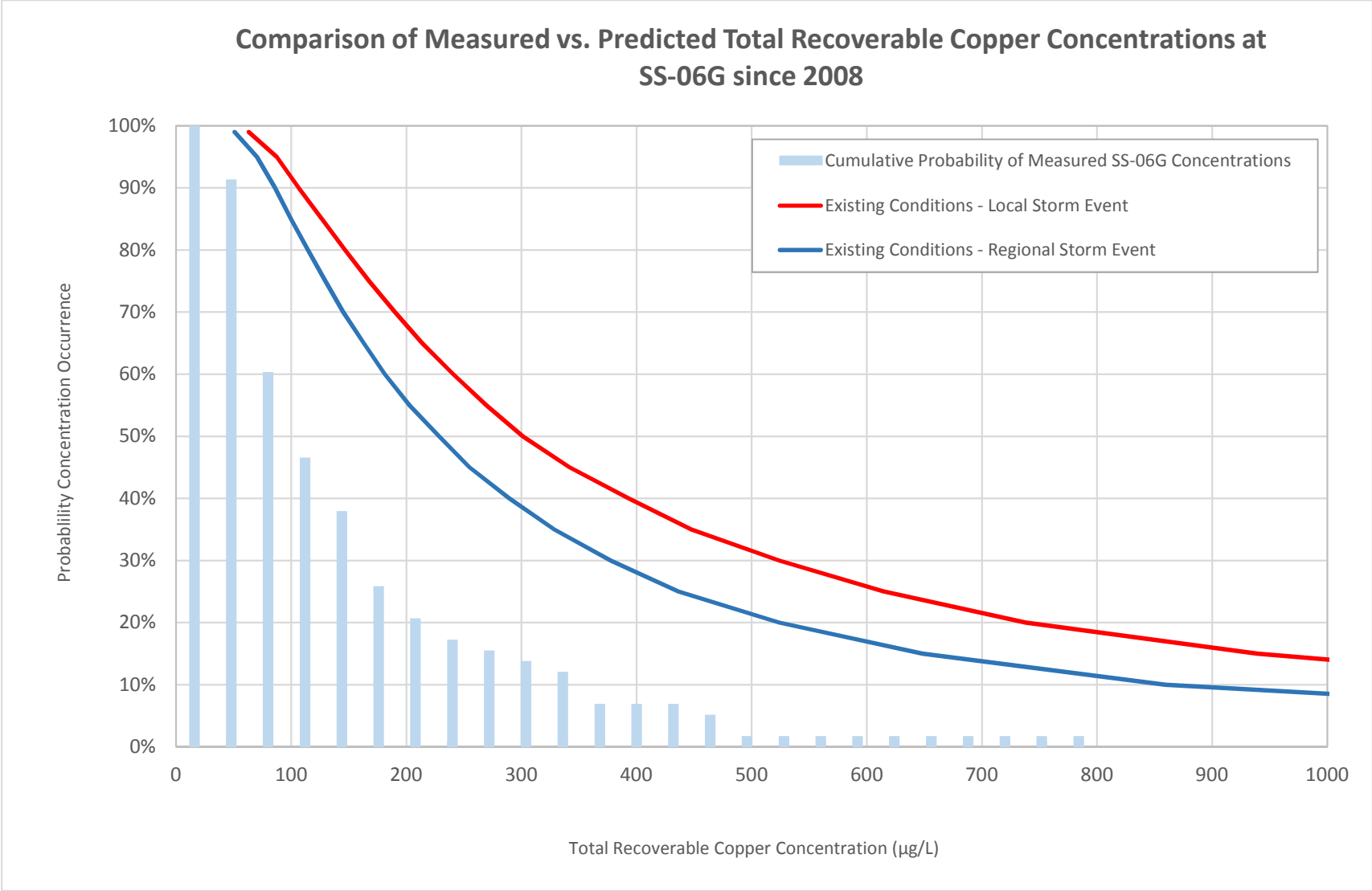

Figure 6-7
Comparison of Measured vs. Predicted Total Recoverable Copper Concentrations at SS-06G since 2008

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

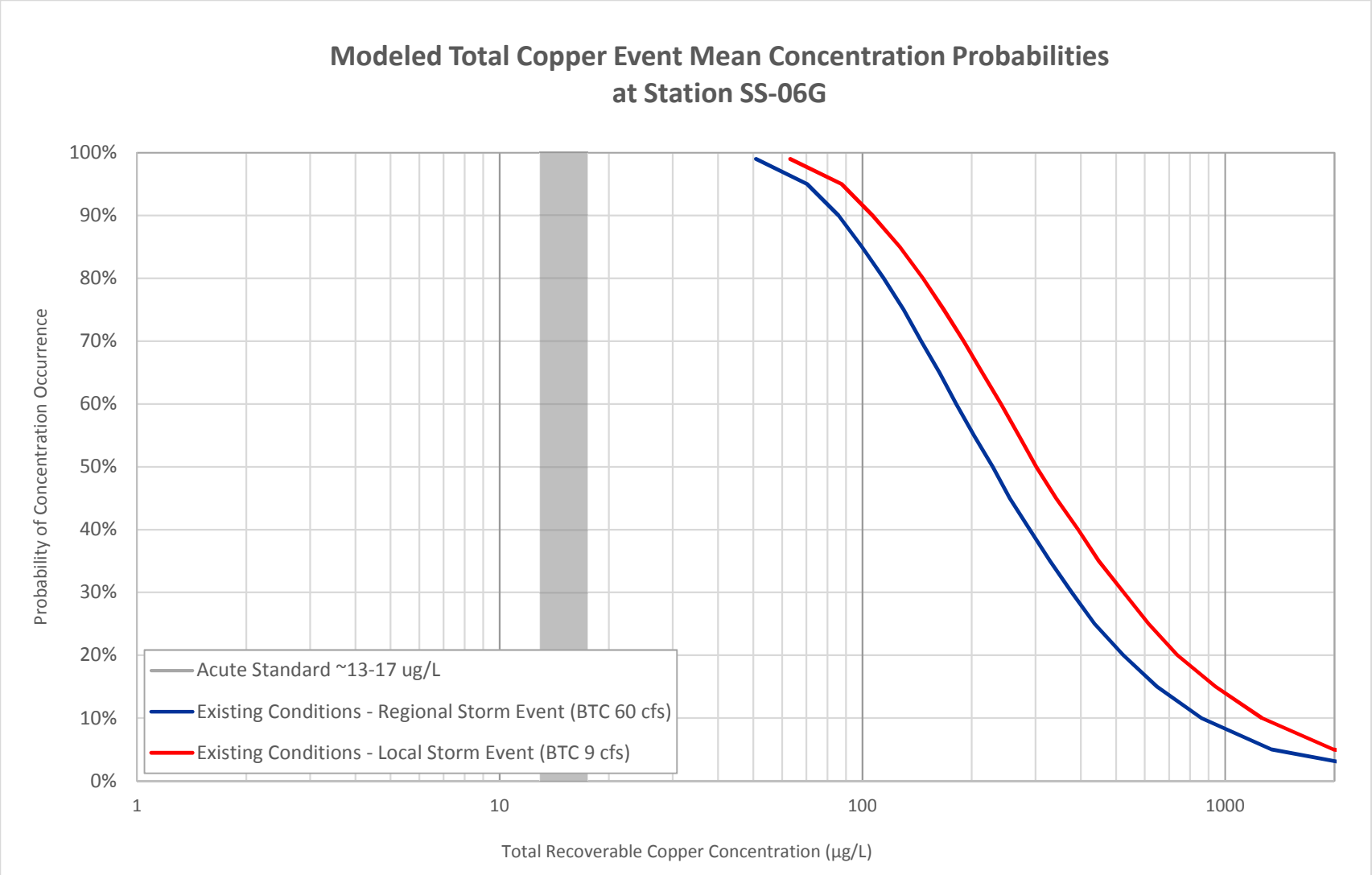

Figure 6-8
Modeled Total Copper Event Mean Concentration Probabilities at Station SS-06G

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

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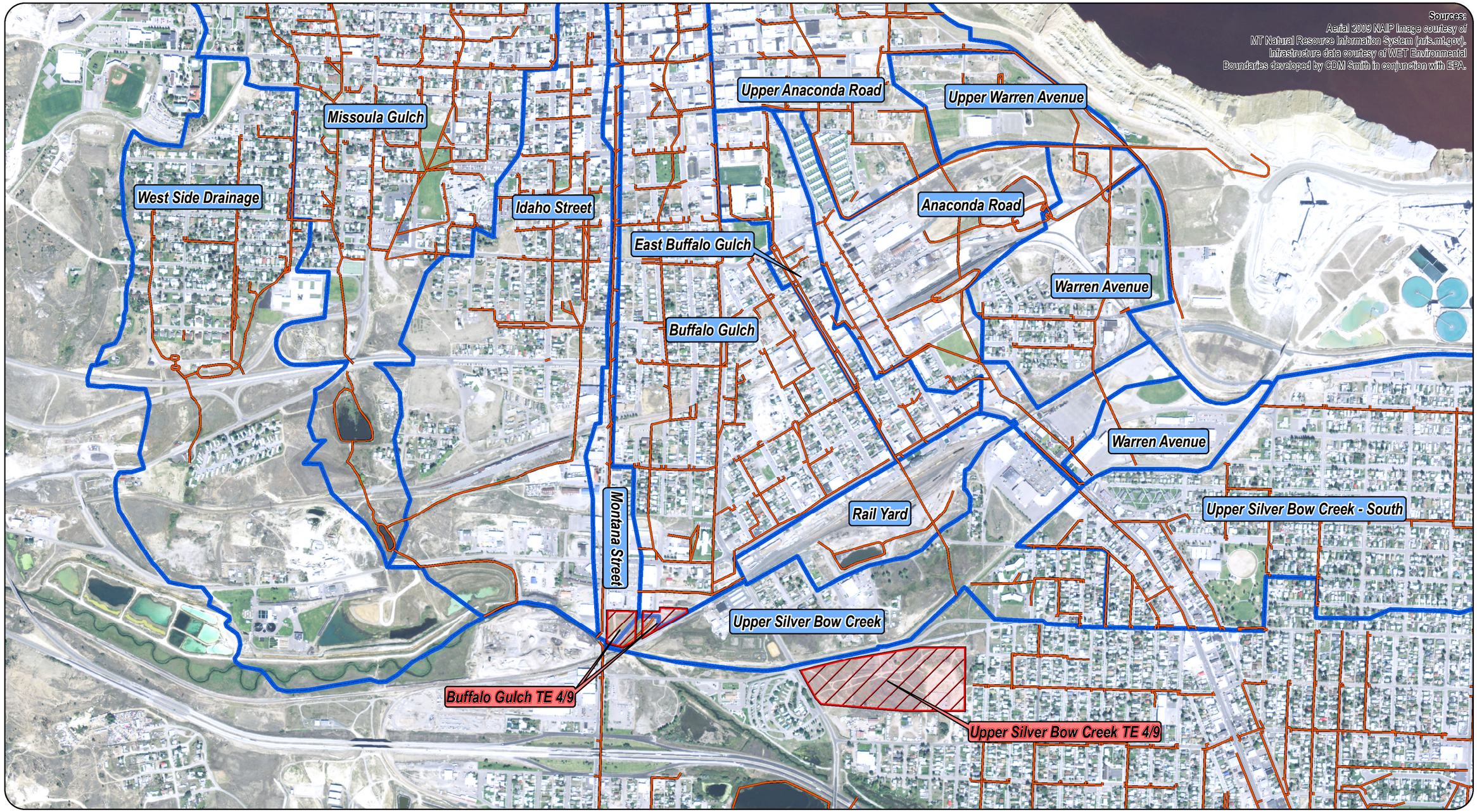


Figure 7-1
Basin Locations

Storm Sewer System
Proposed Detention/Retention or Bioretention Basin Location
Drainage Area Boundary

0 1,000 2,000 3,000
Feet

N W E S

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

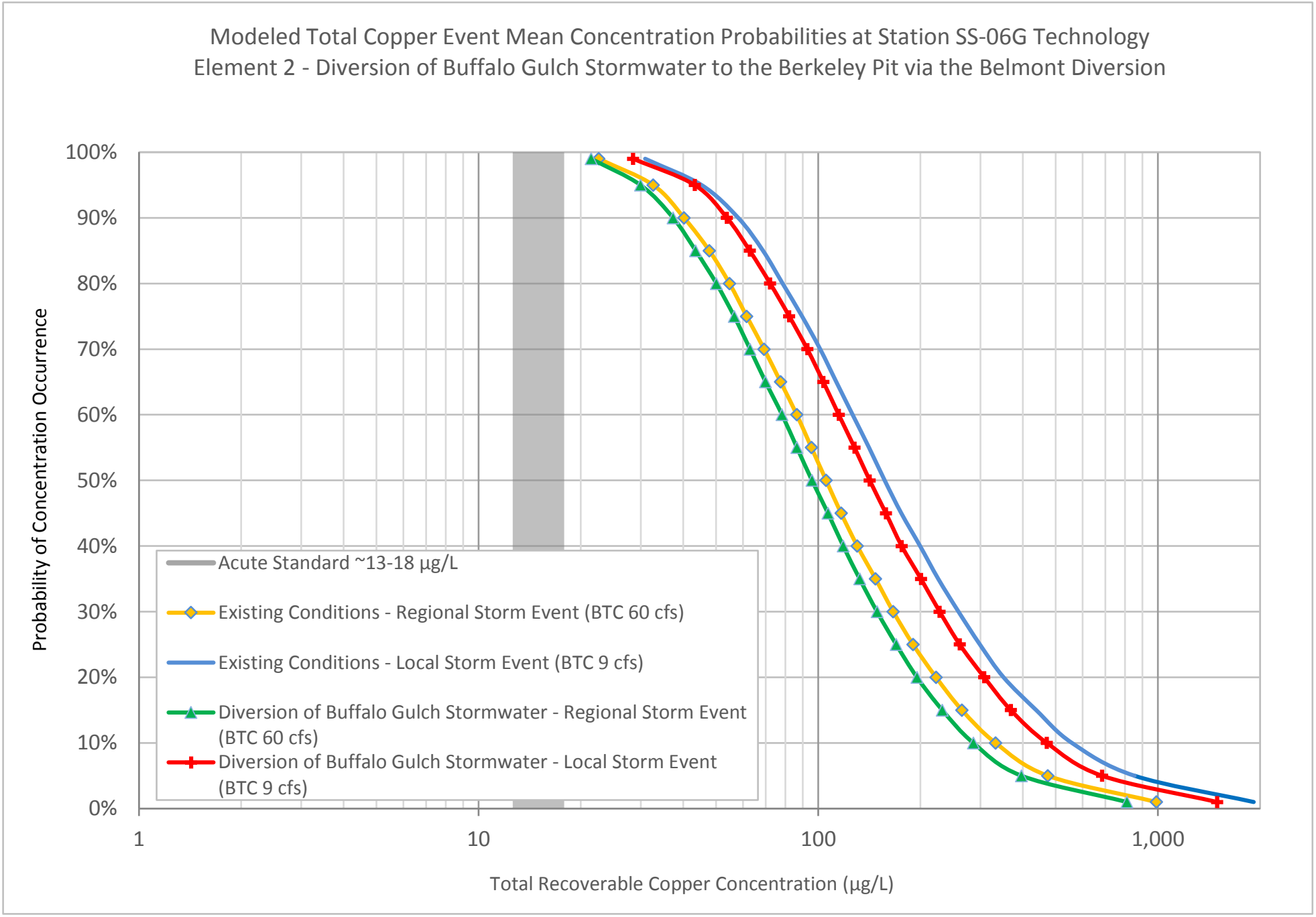


Figure 7-2
Event Mean Concentration Results

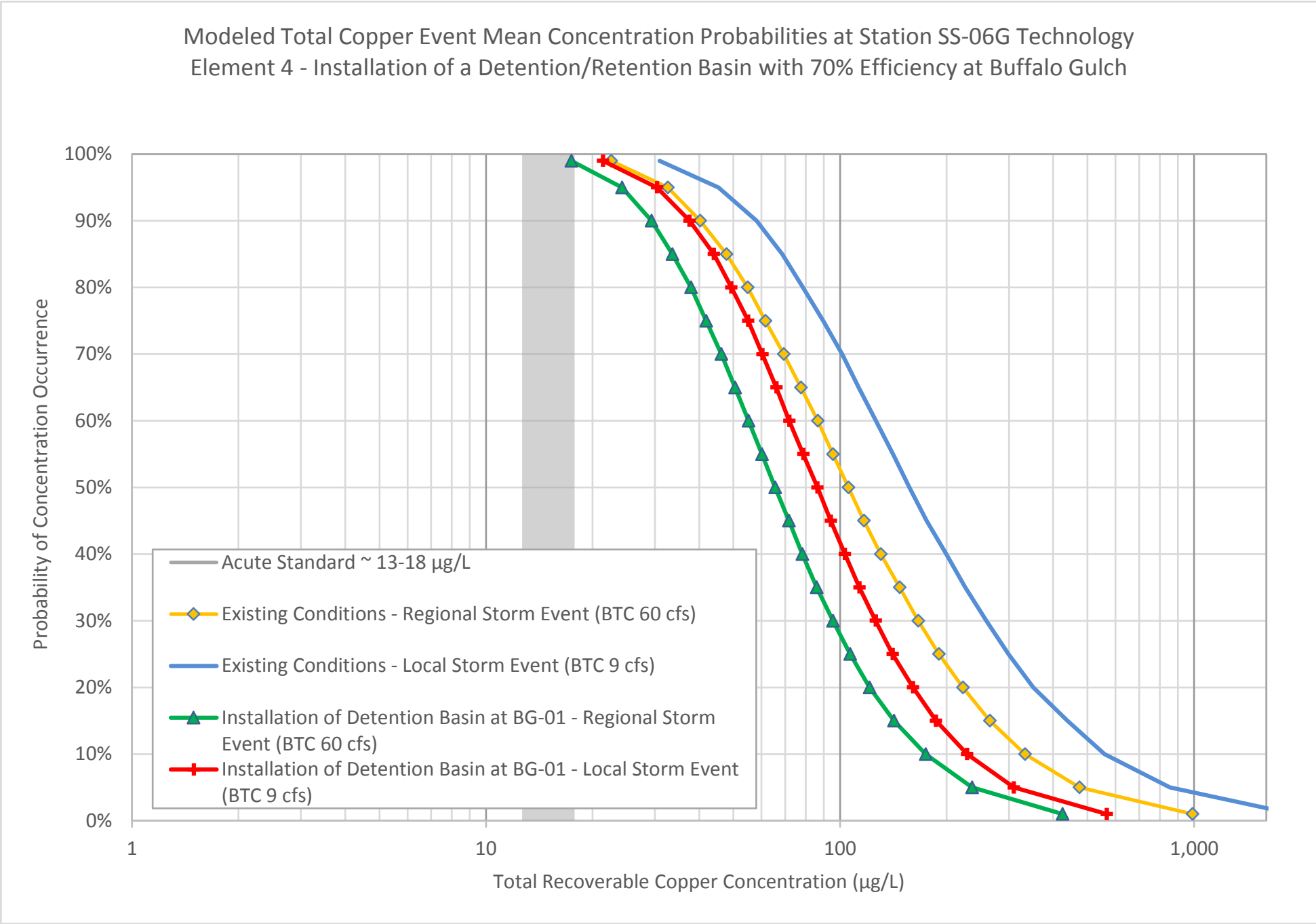


Figure 7-3
Event Mean Concentration Results

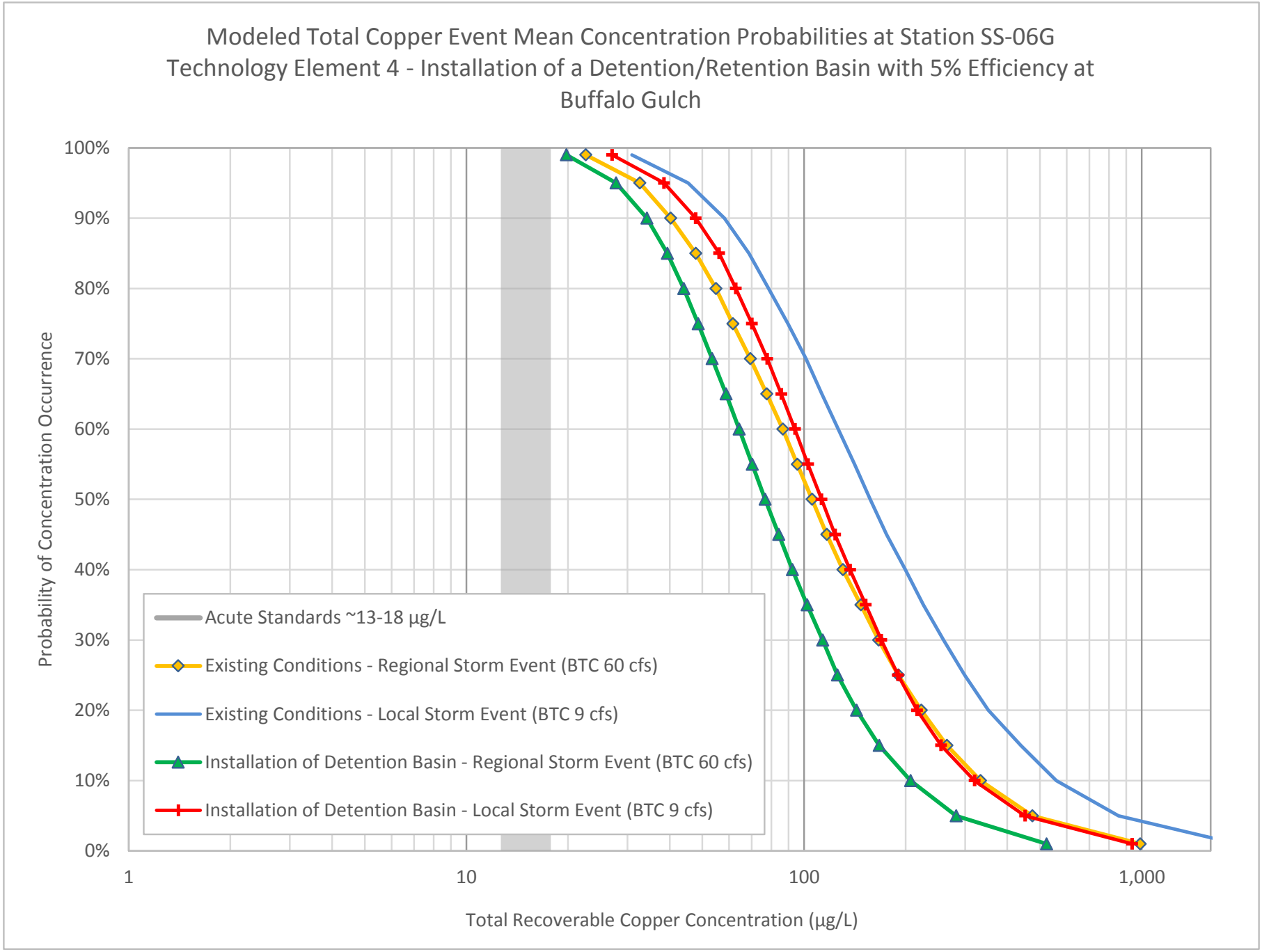


Figure 7-4
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

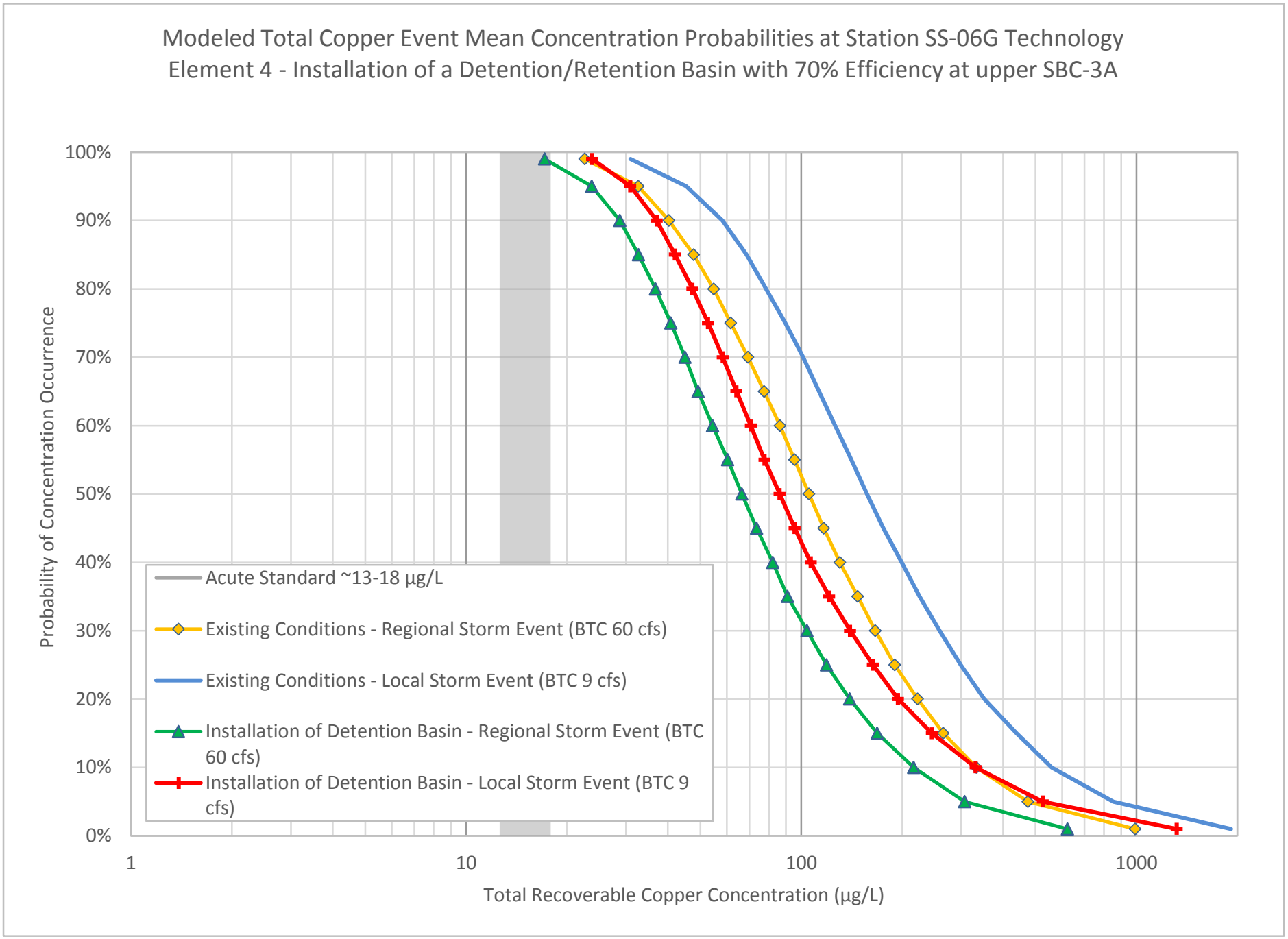


Figure 7-5
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

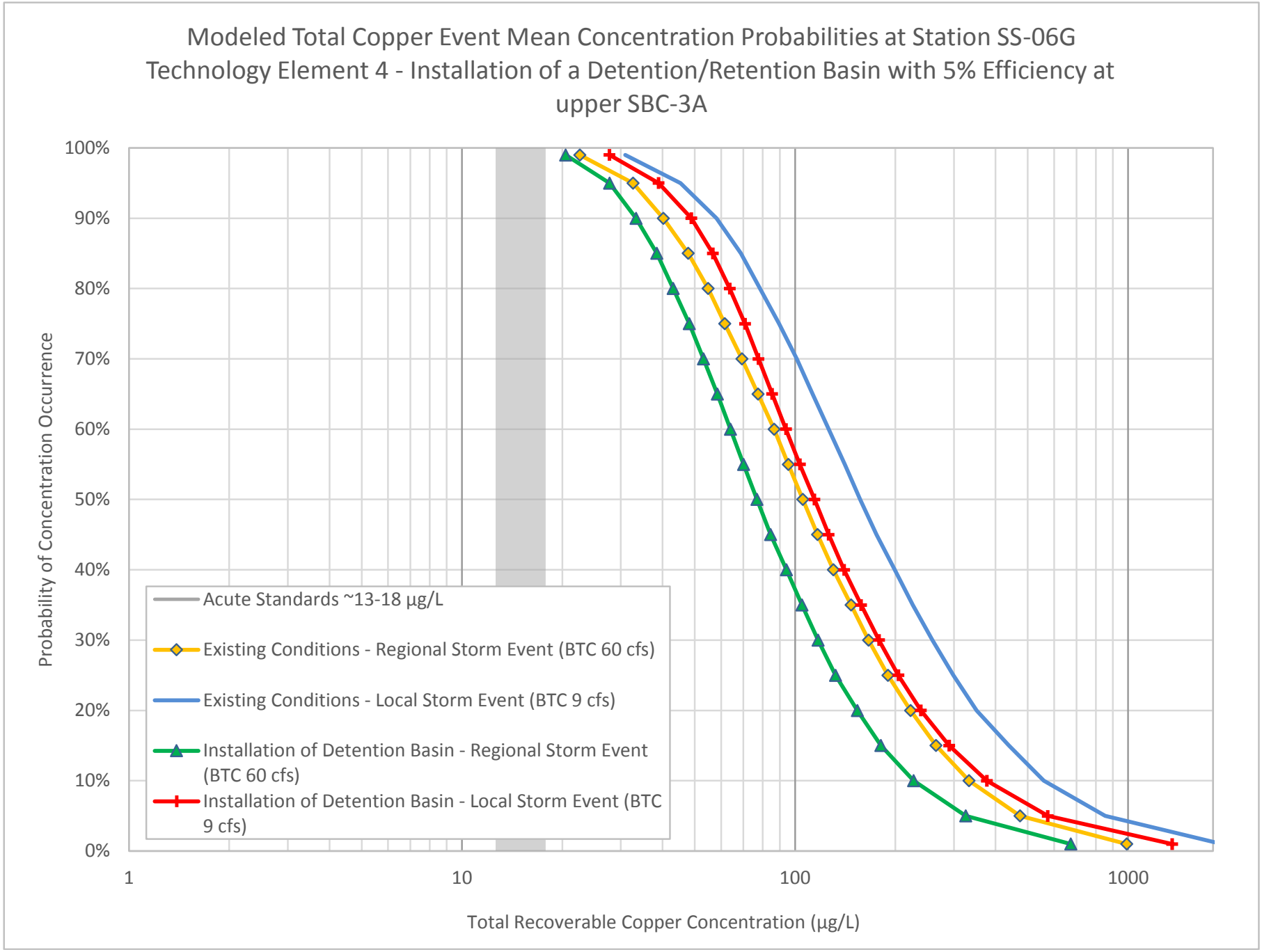


Figure 7-6
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

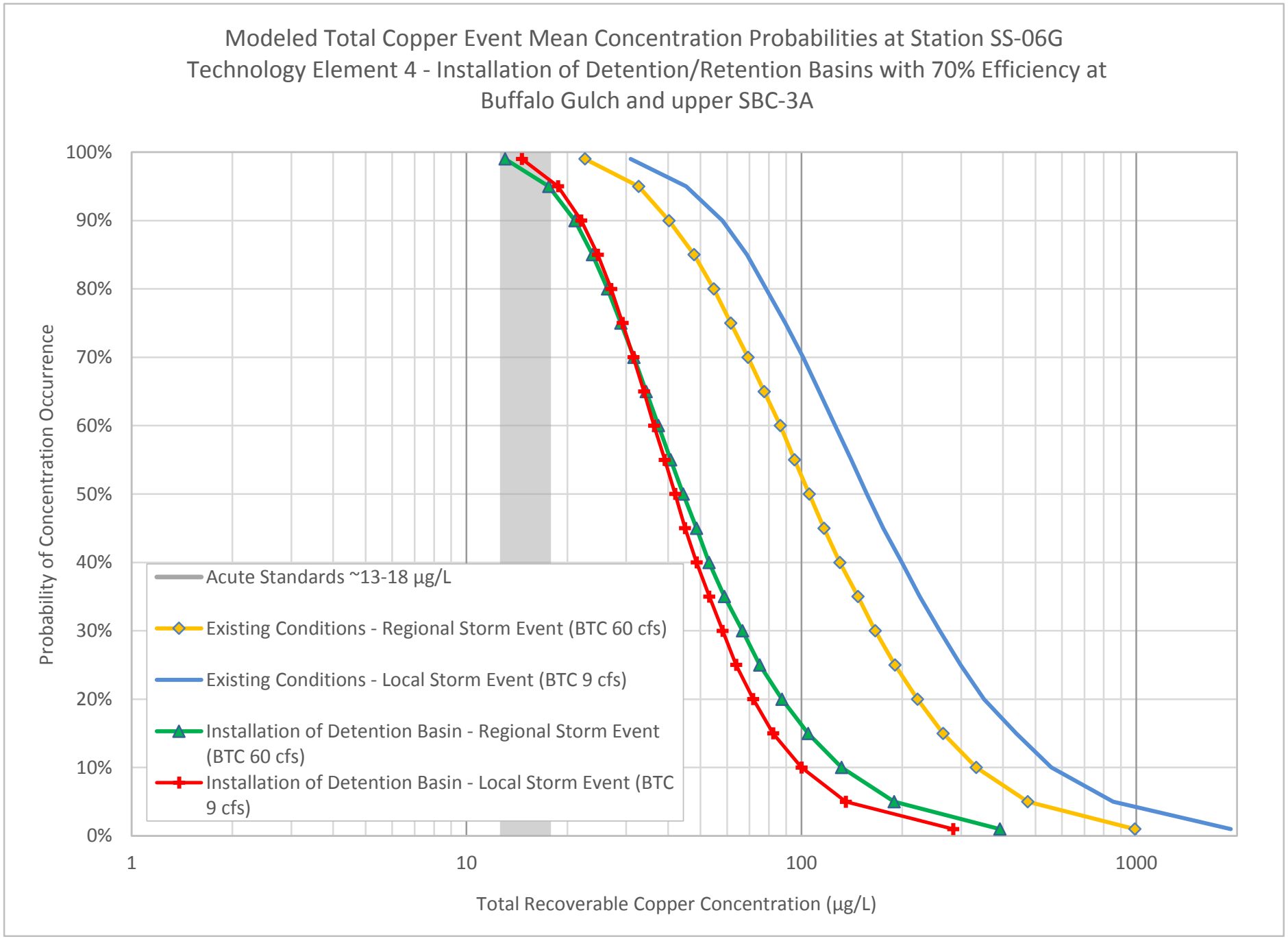


Figure 7-7
Event Mean Concentration Results

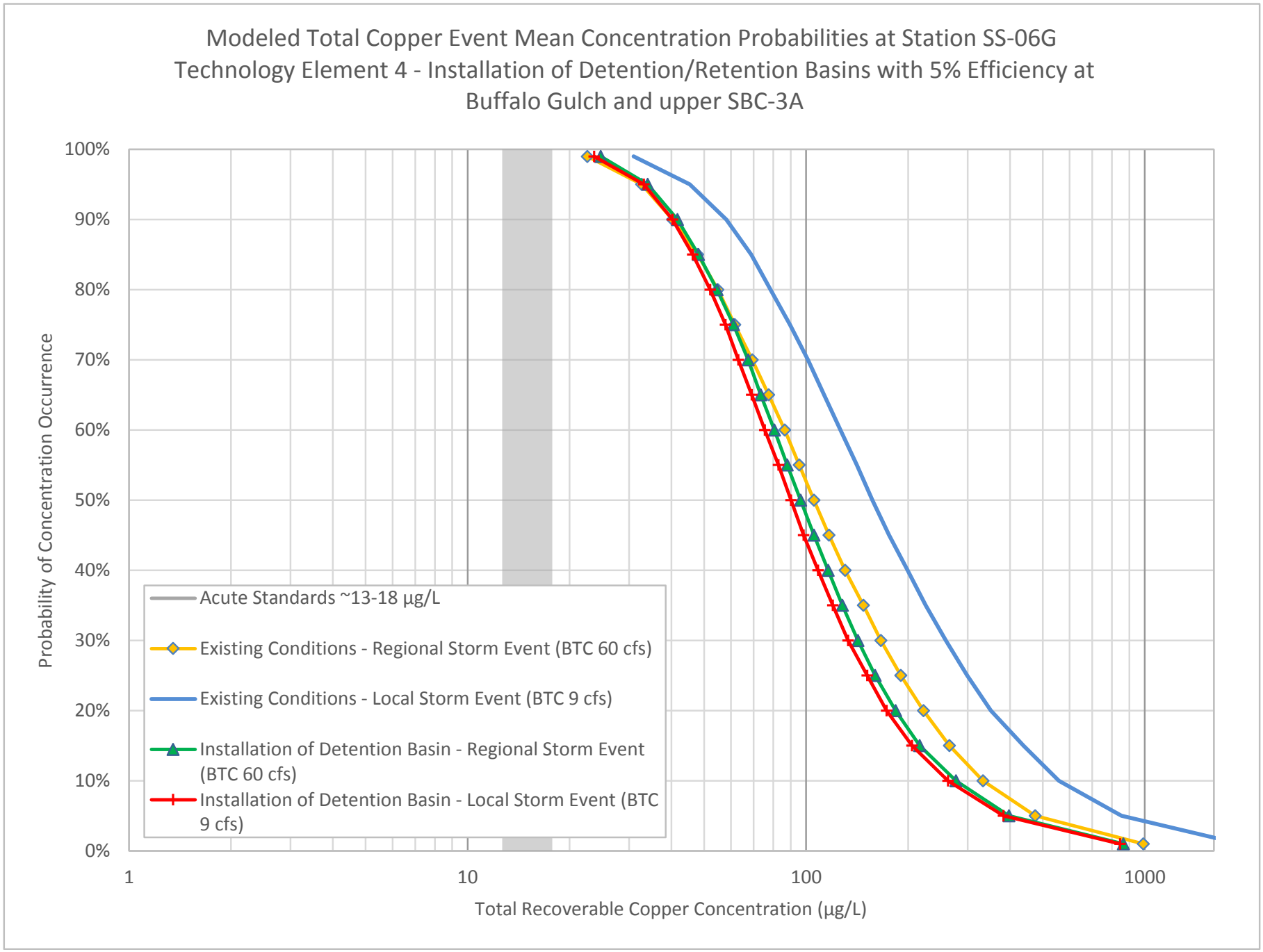


Figure 7-8
Event Mean Concentration Results

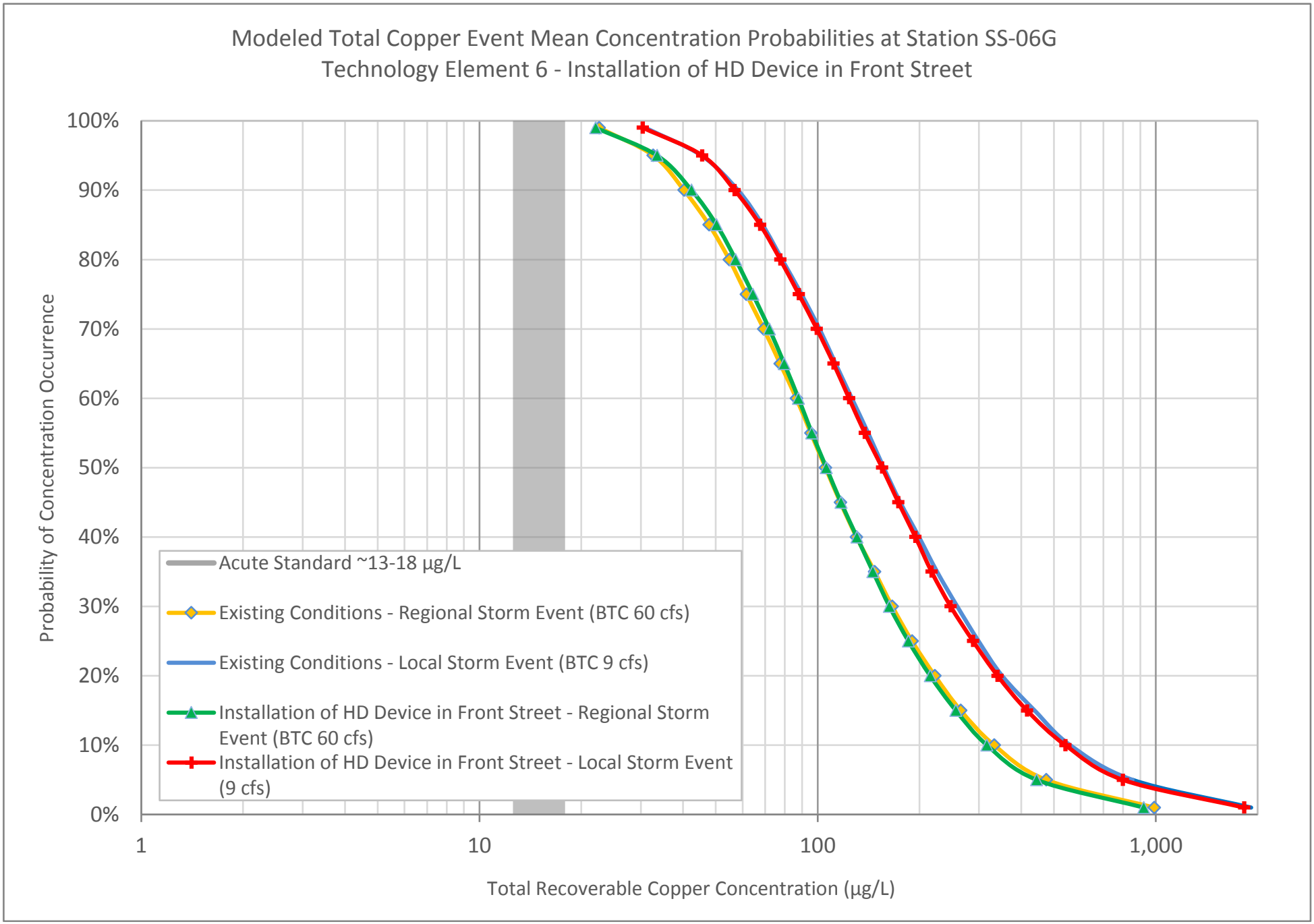


Figure 7-9
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

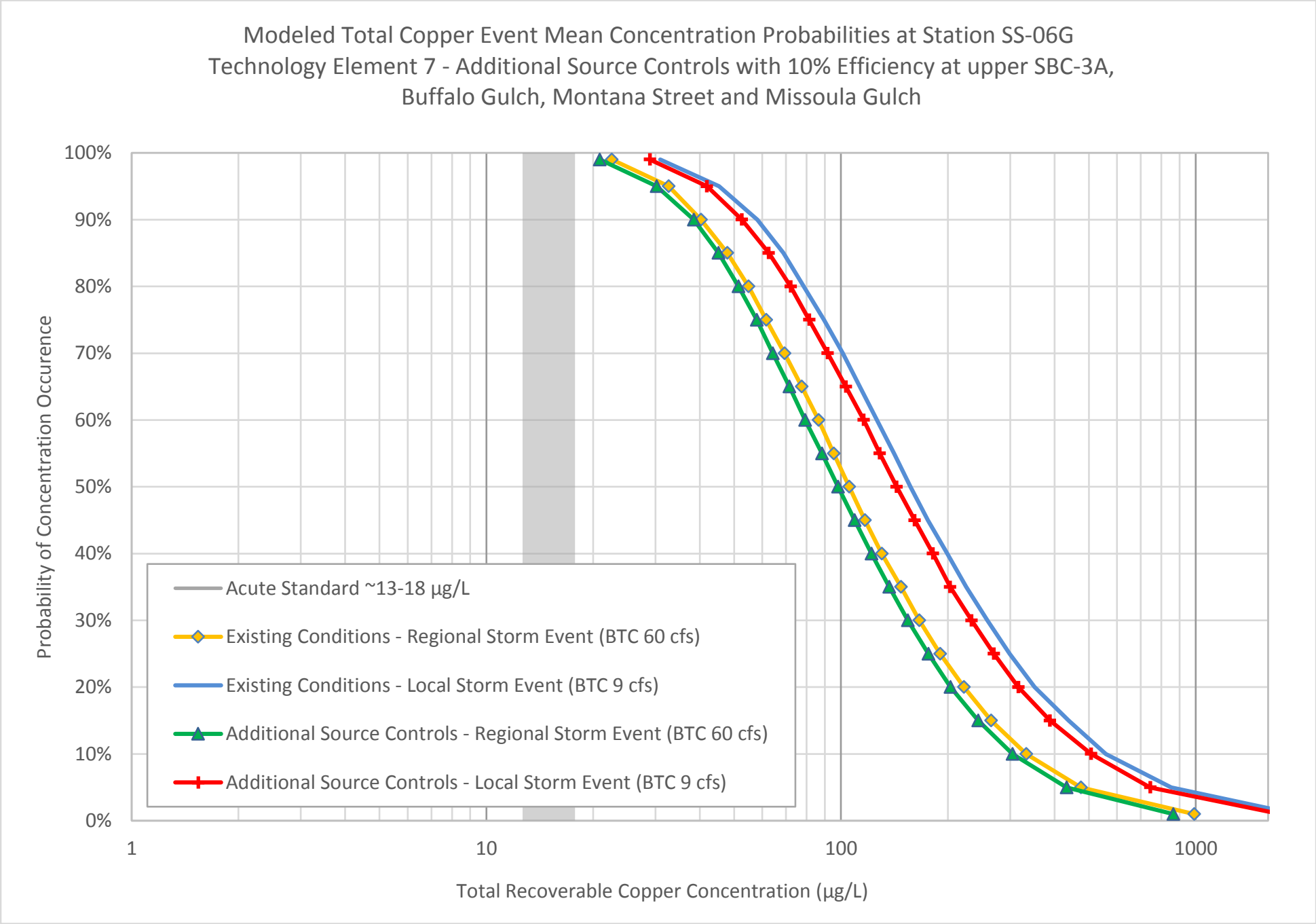


Figure 7-10
Event Mean Concentration Results

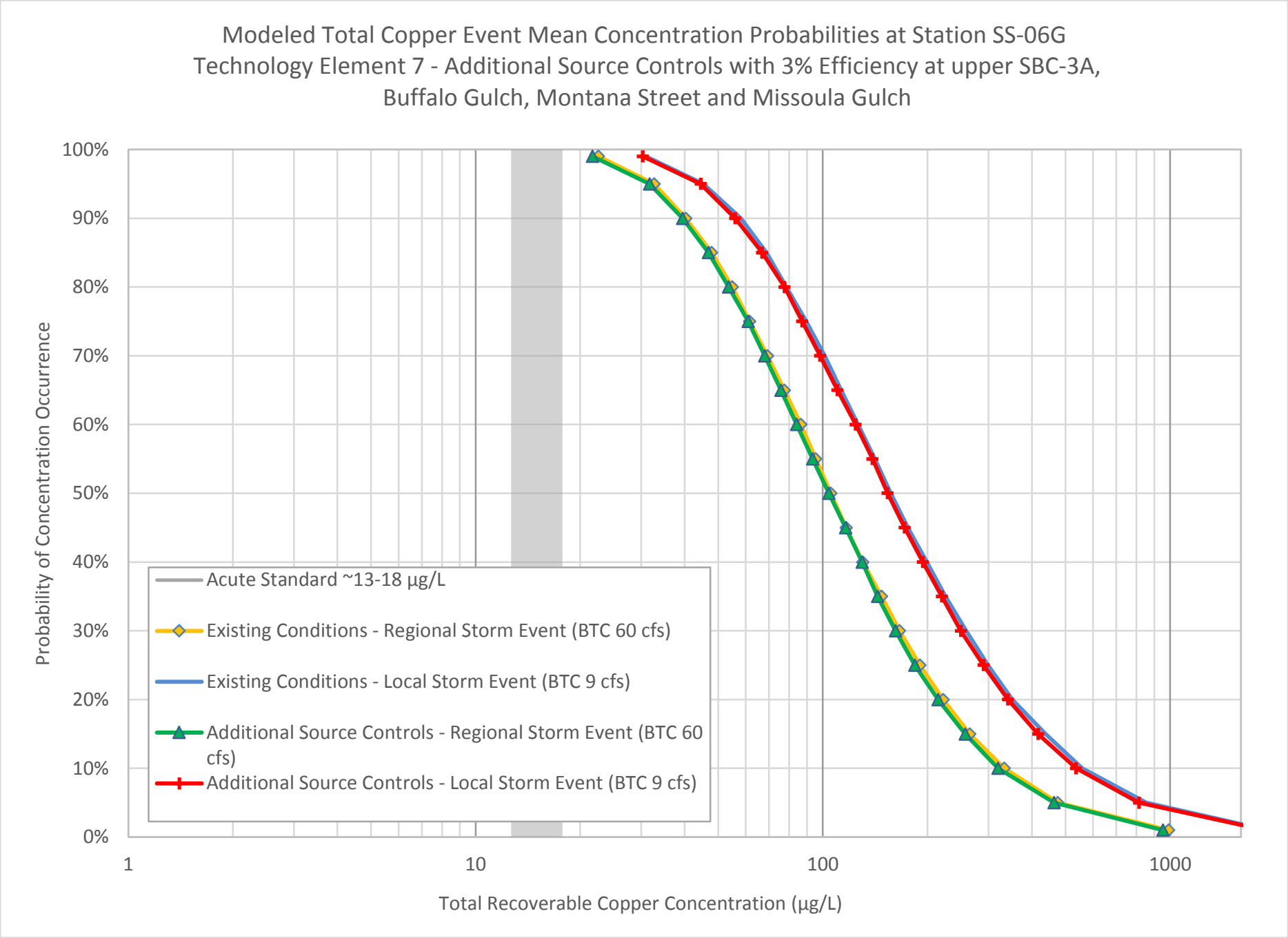


Figure 7-11
Event Mean Concentration Results

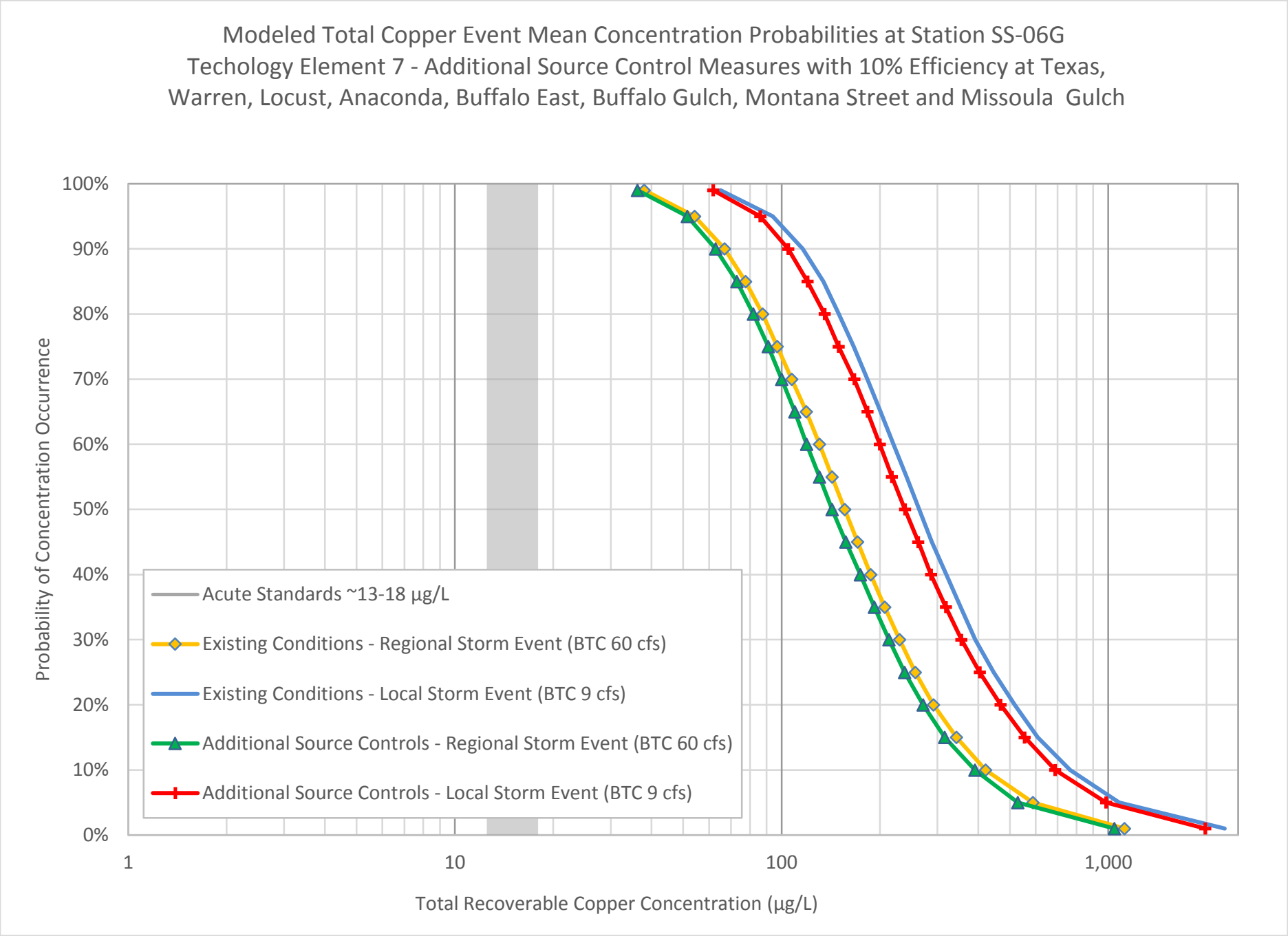


Figure 7-12
Event Mean Concentration Results

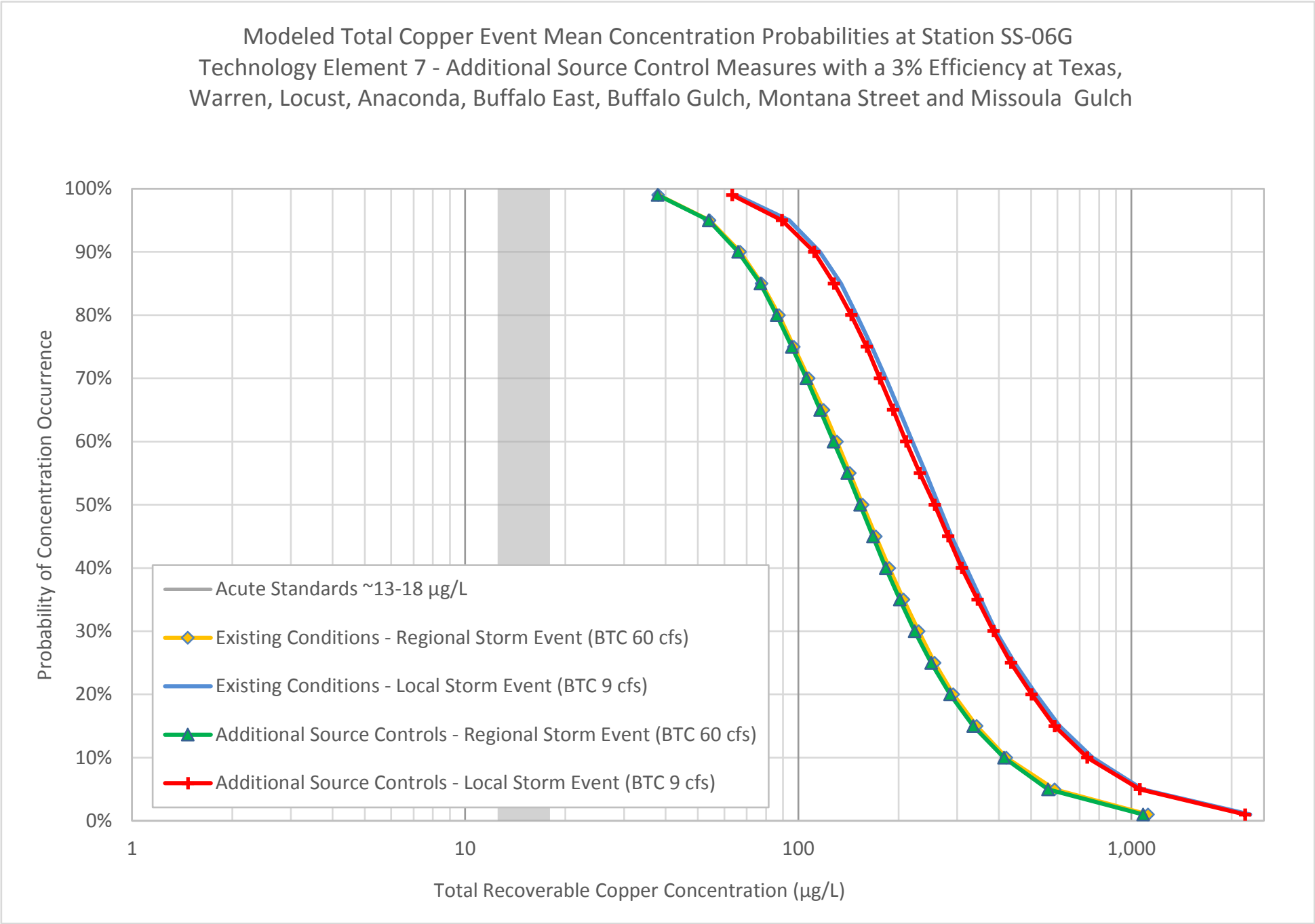


Figure 7-13
Event Mean Concentration Results

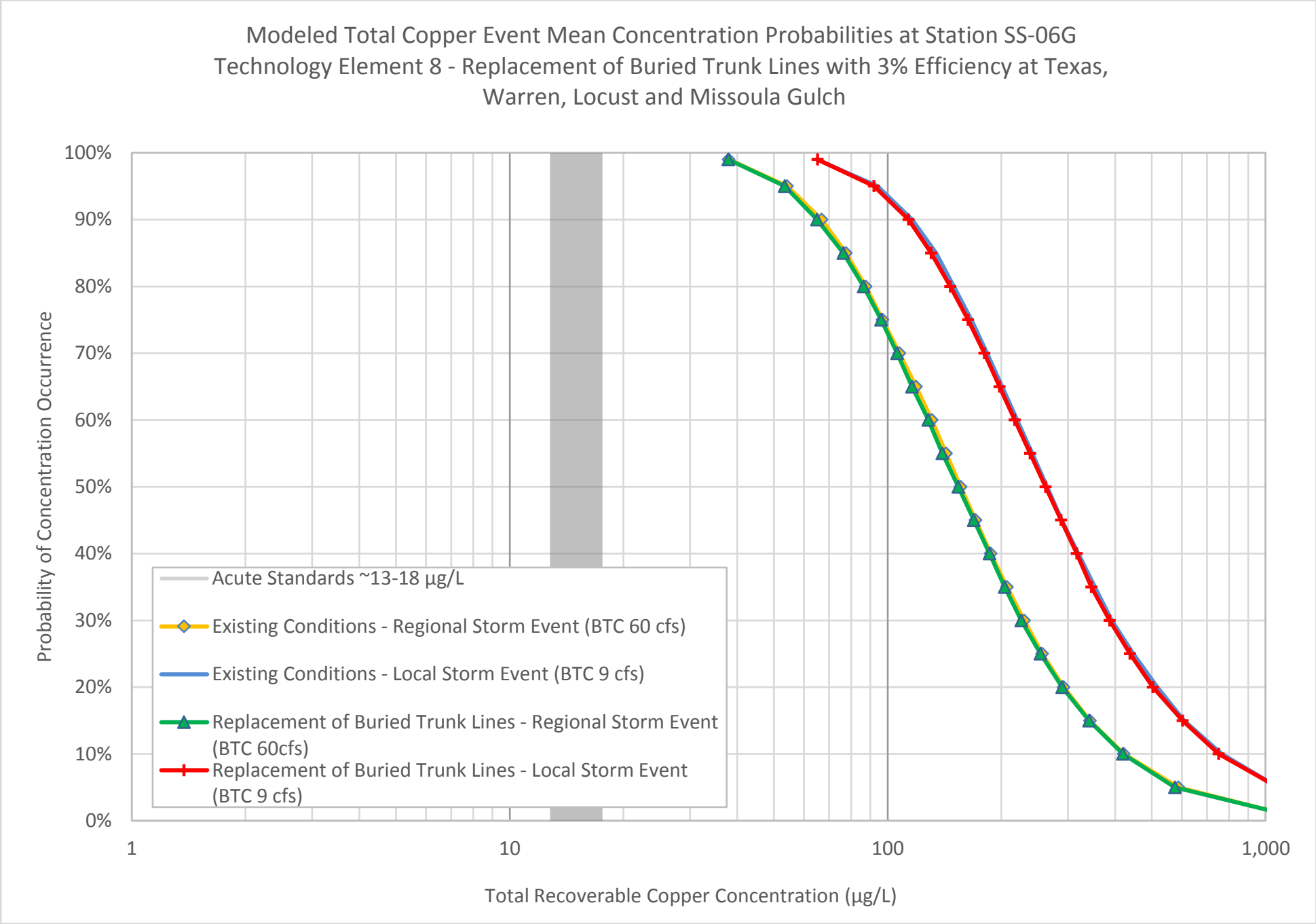


Figure 7-14
Event Mean Concentration Results

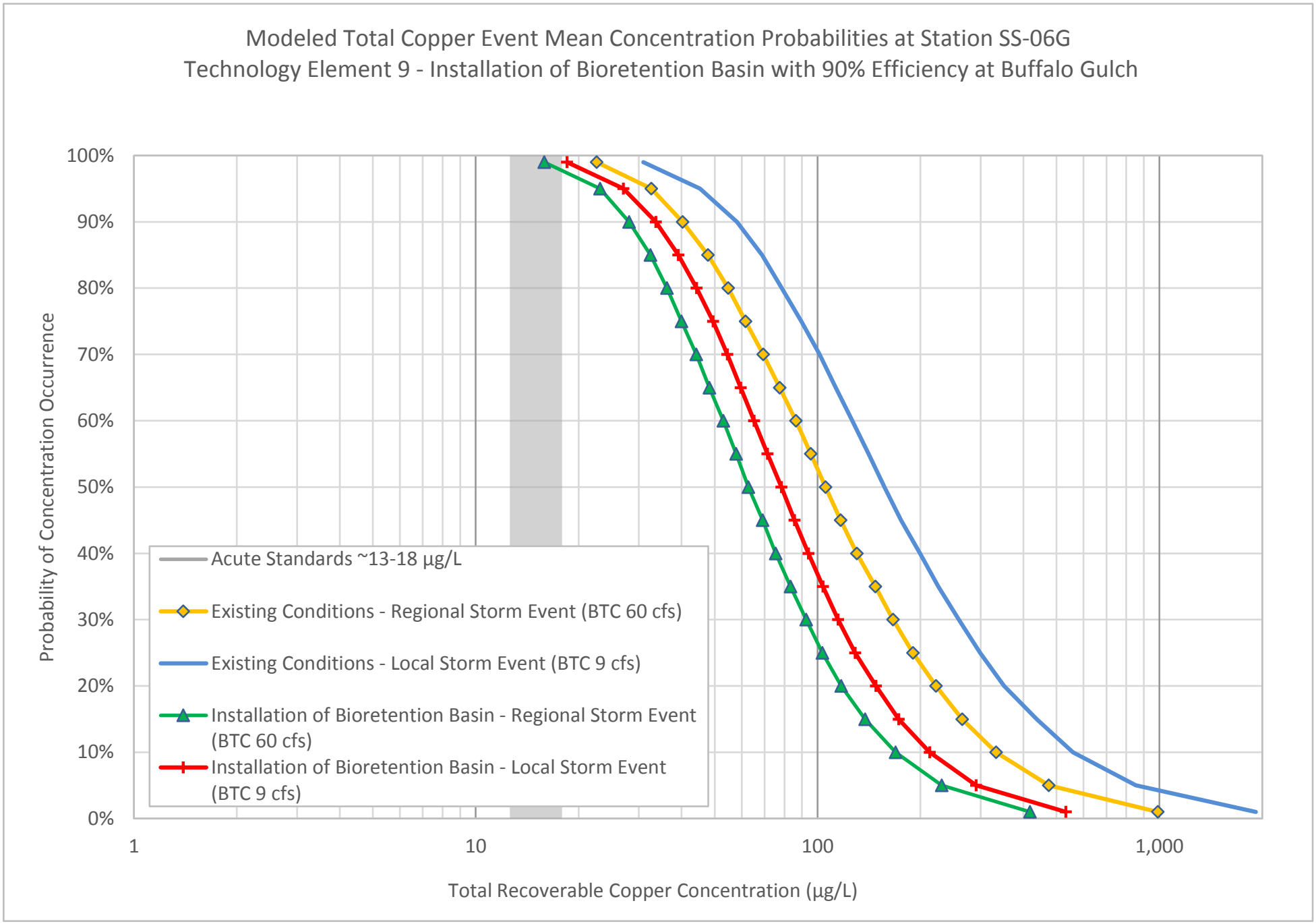


Figure 7-15
Event Mean Concentration Results

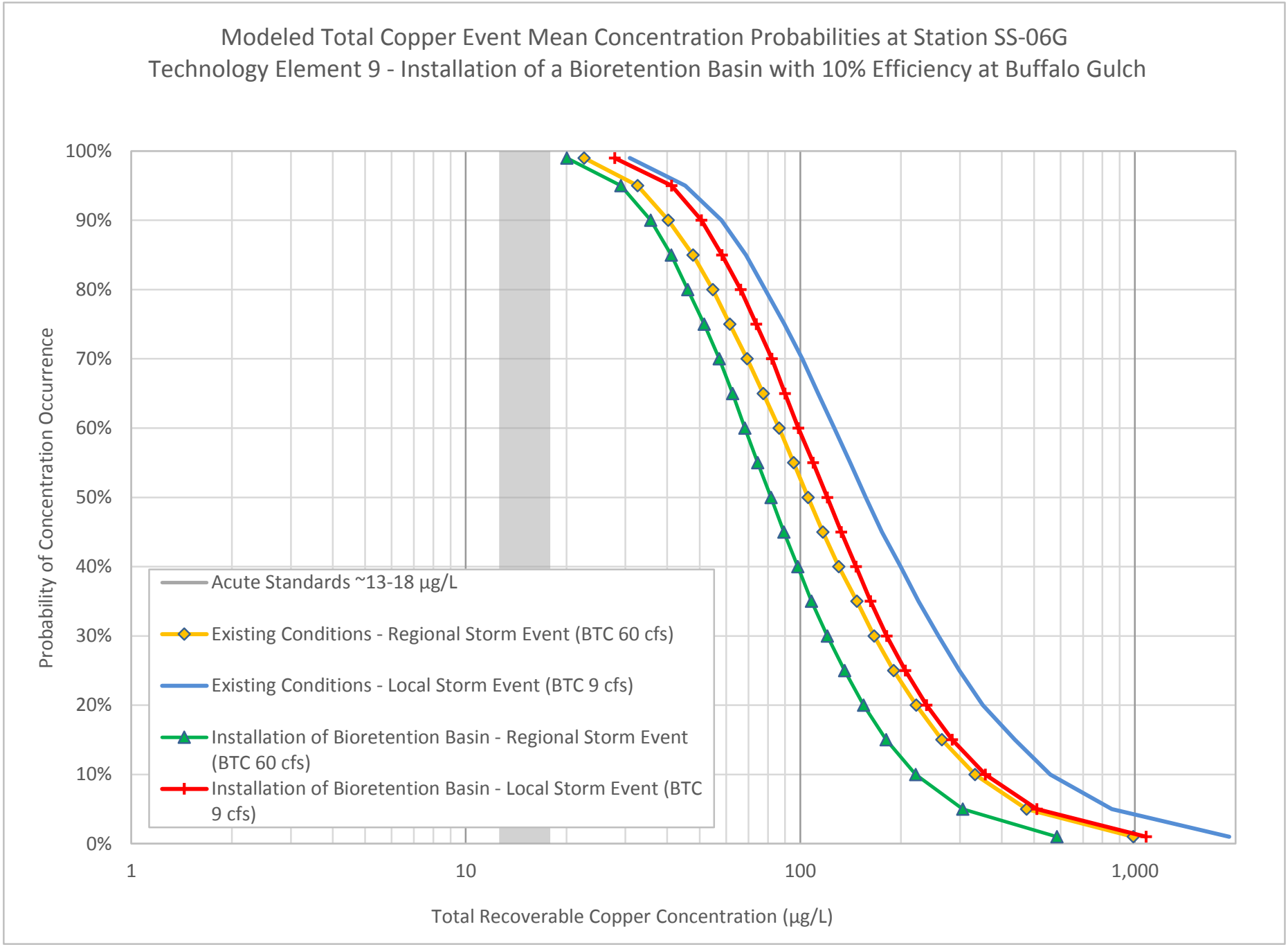


Figure 7-16
Event Mean Concentration Results

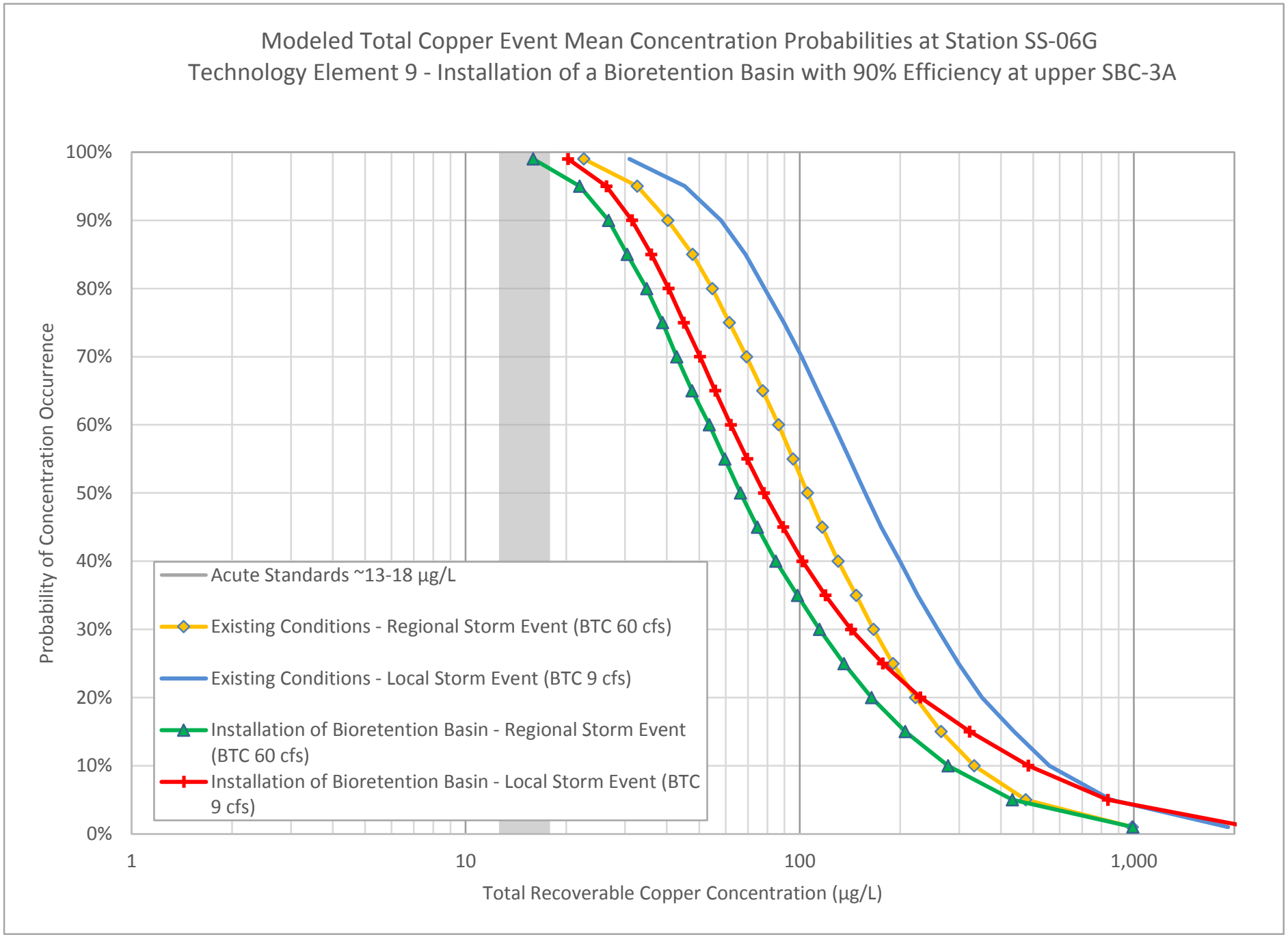


Figure 7-17
Event Mean Concentration Results

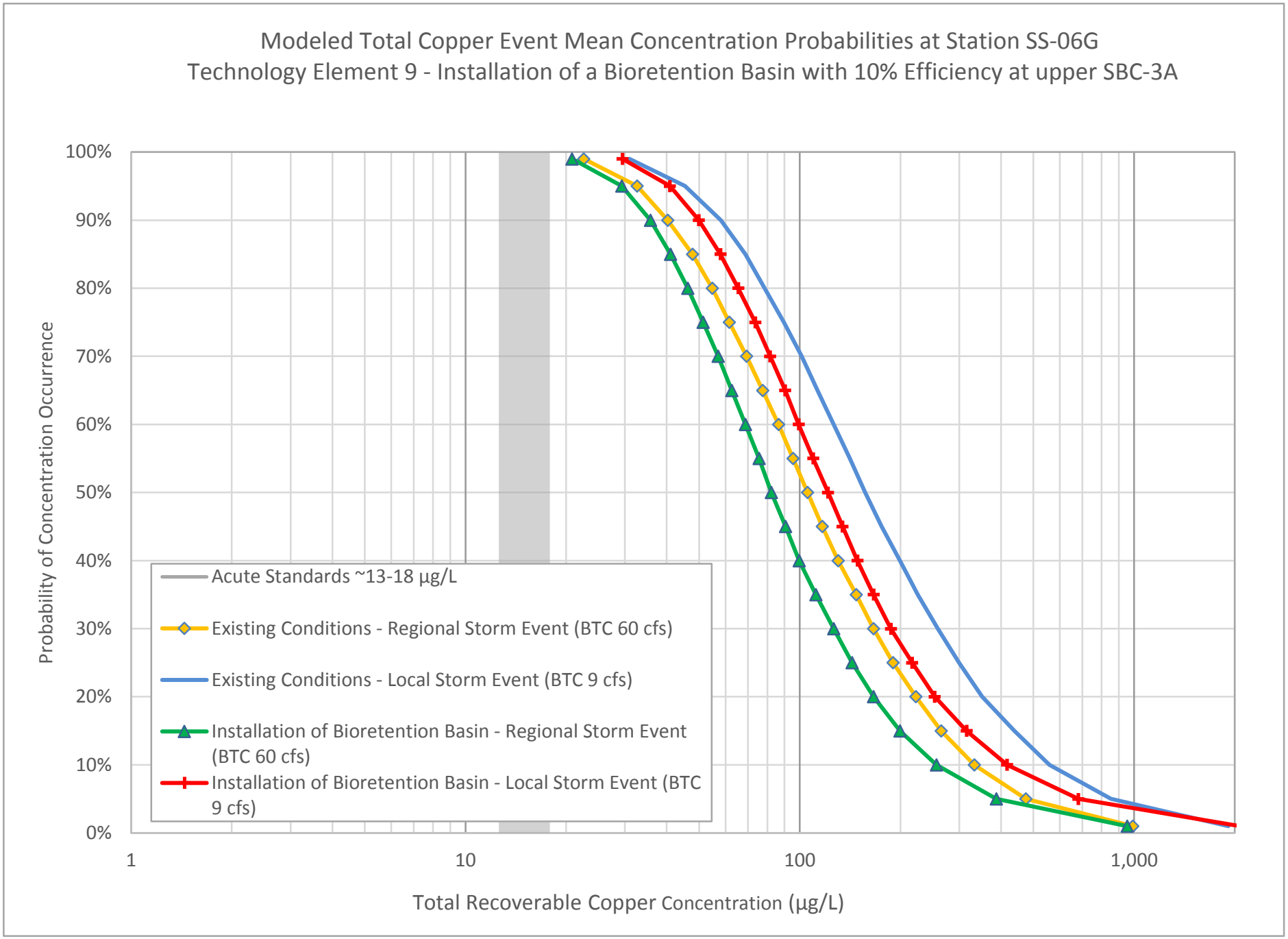


Figure 7-18
Event Mean Concentration Results

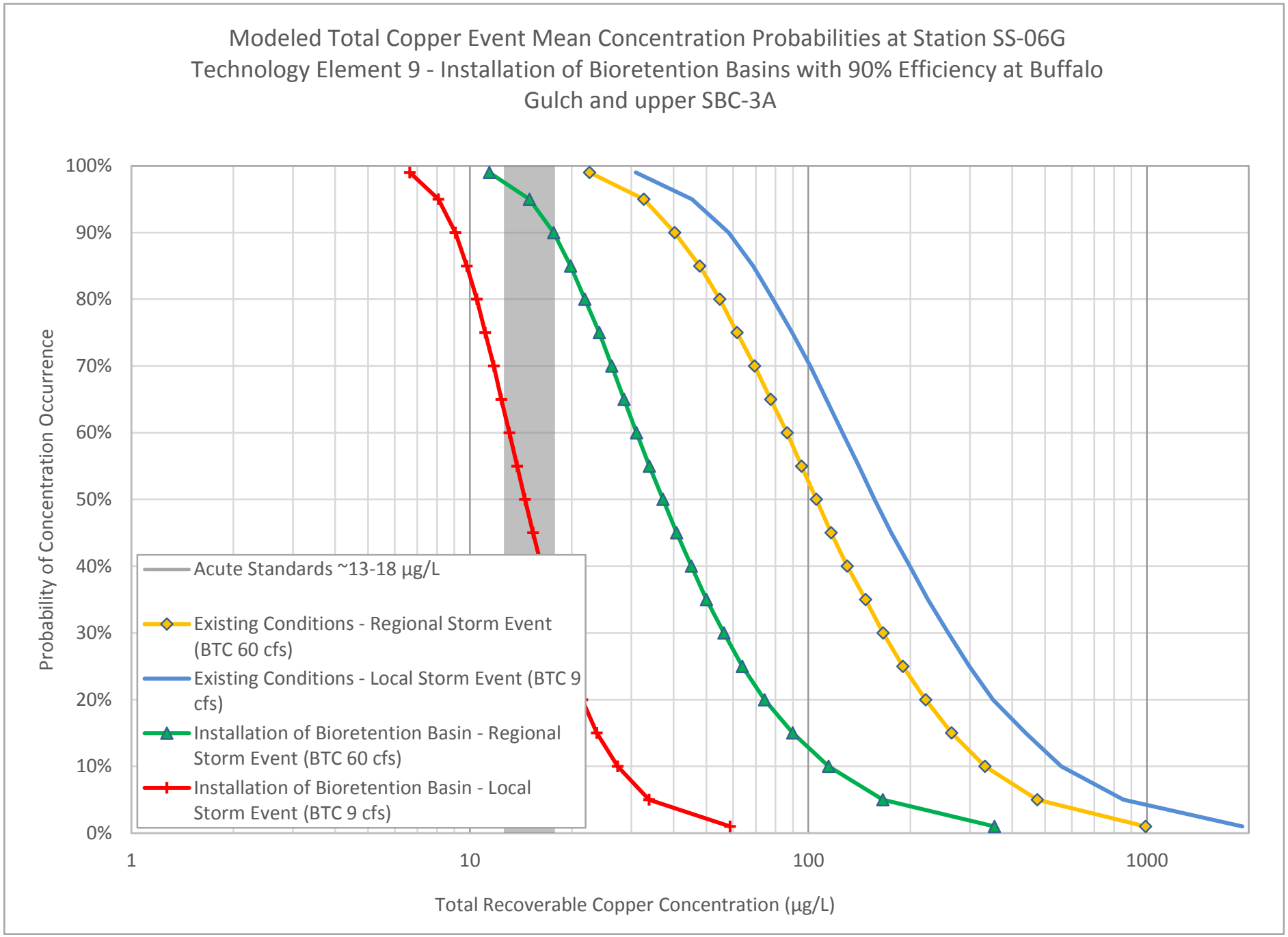


Figure 7-19
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

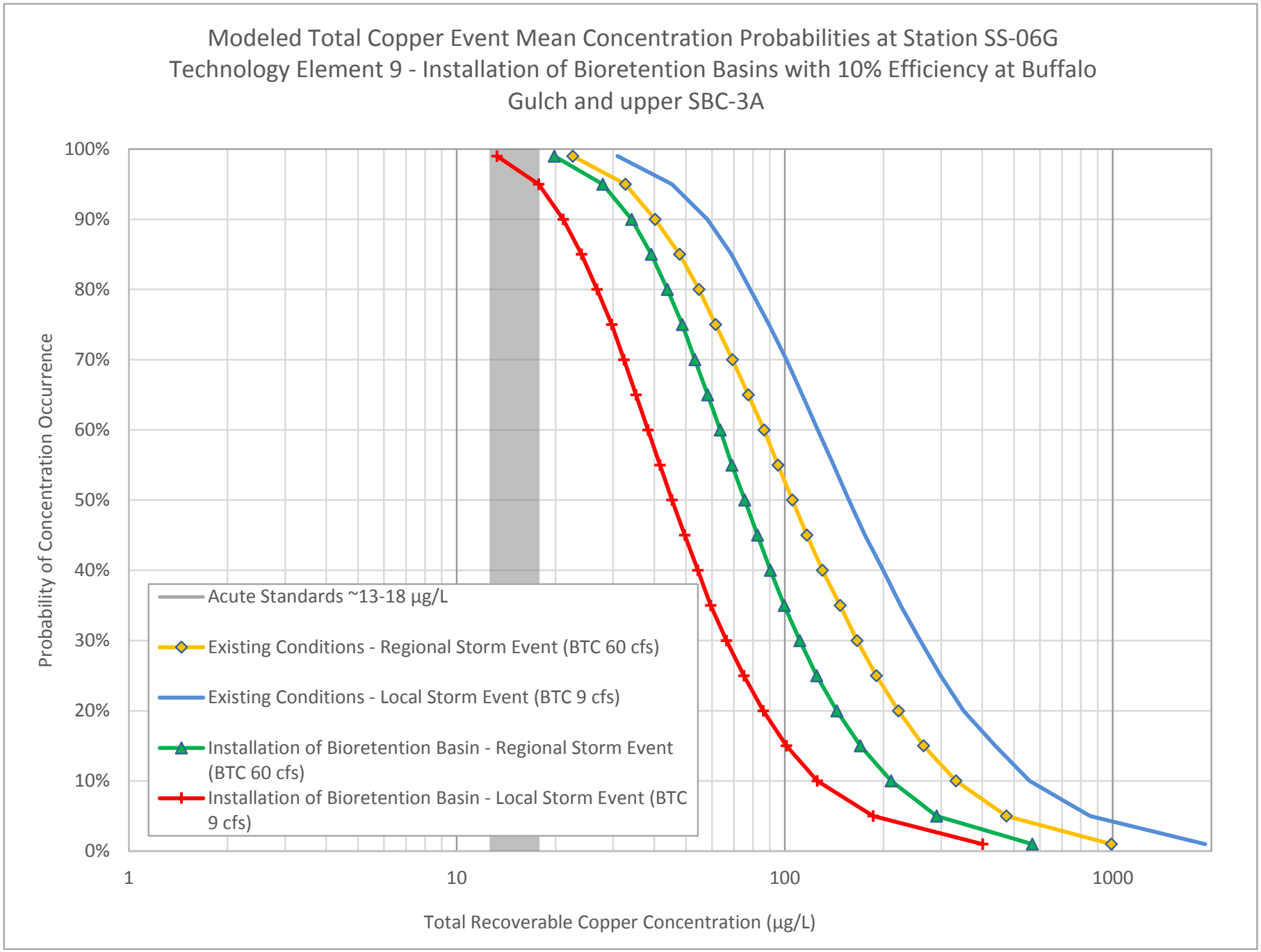


Figure 7-20
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

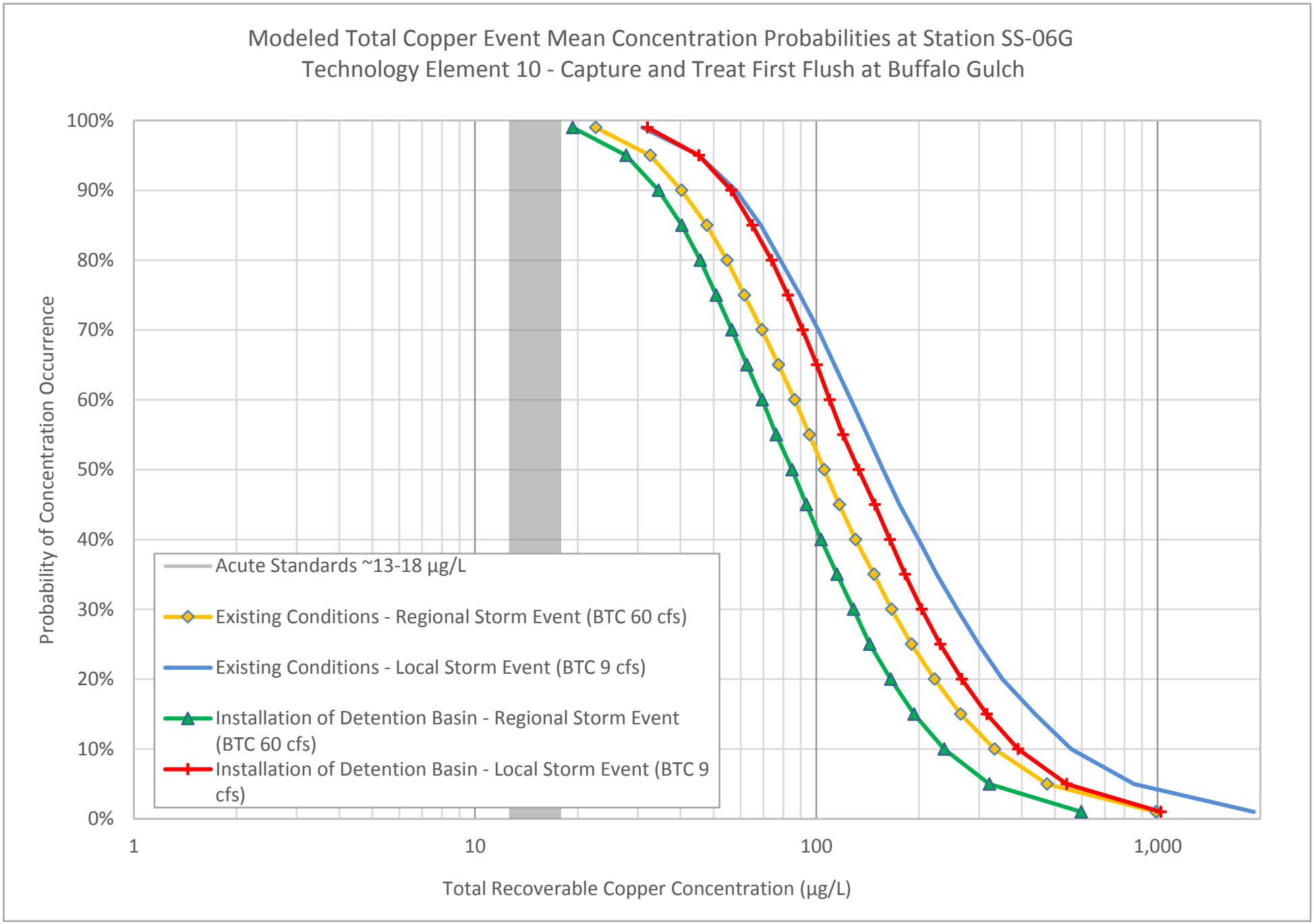


Figure 7-21
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

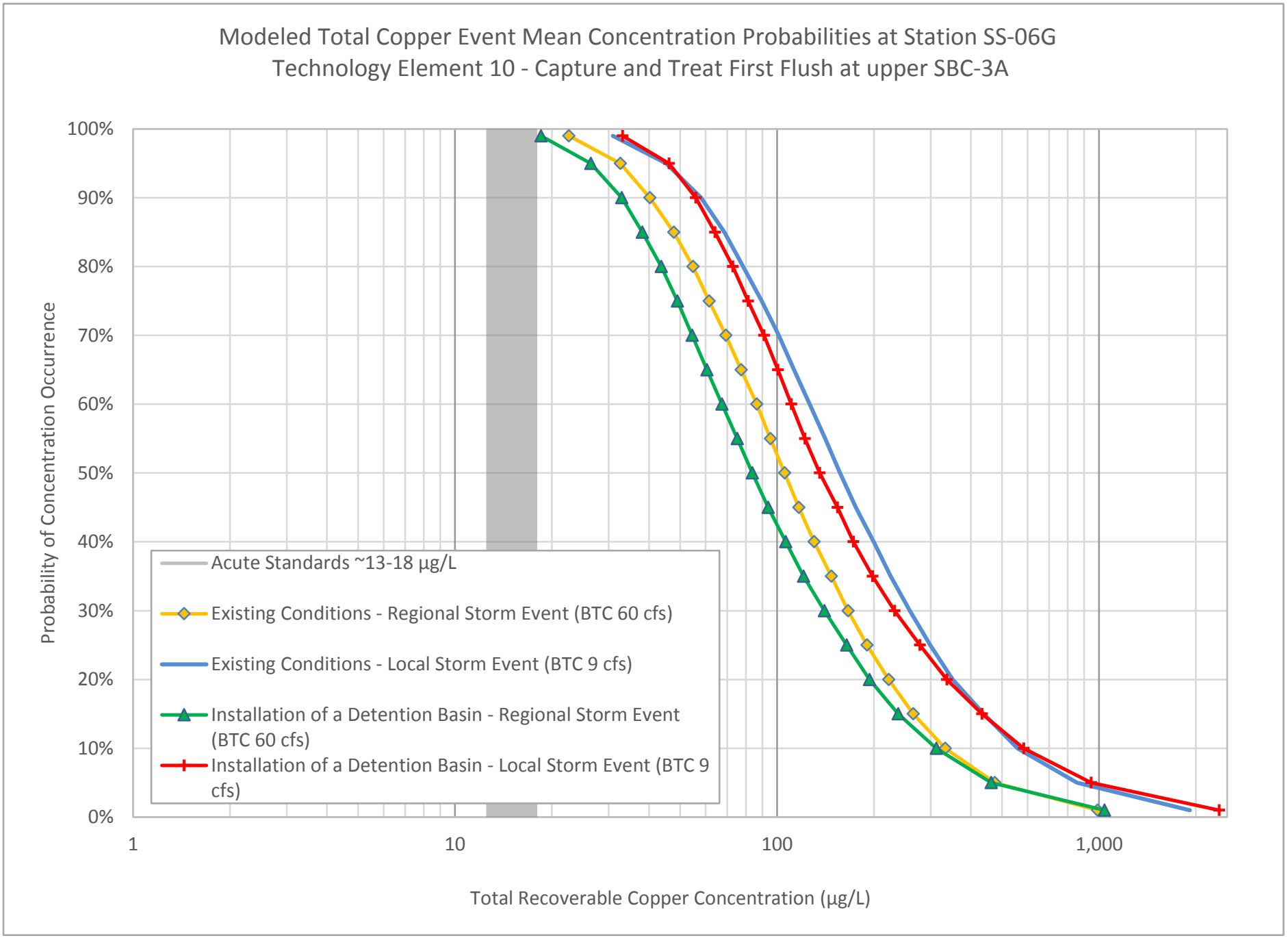


Figure 7-22
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

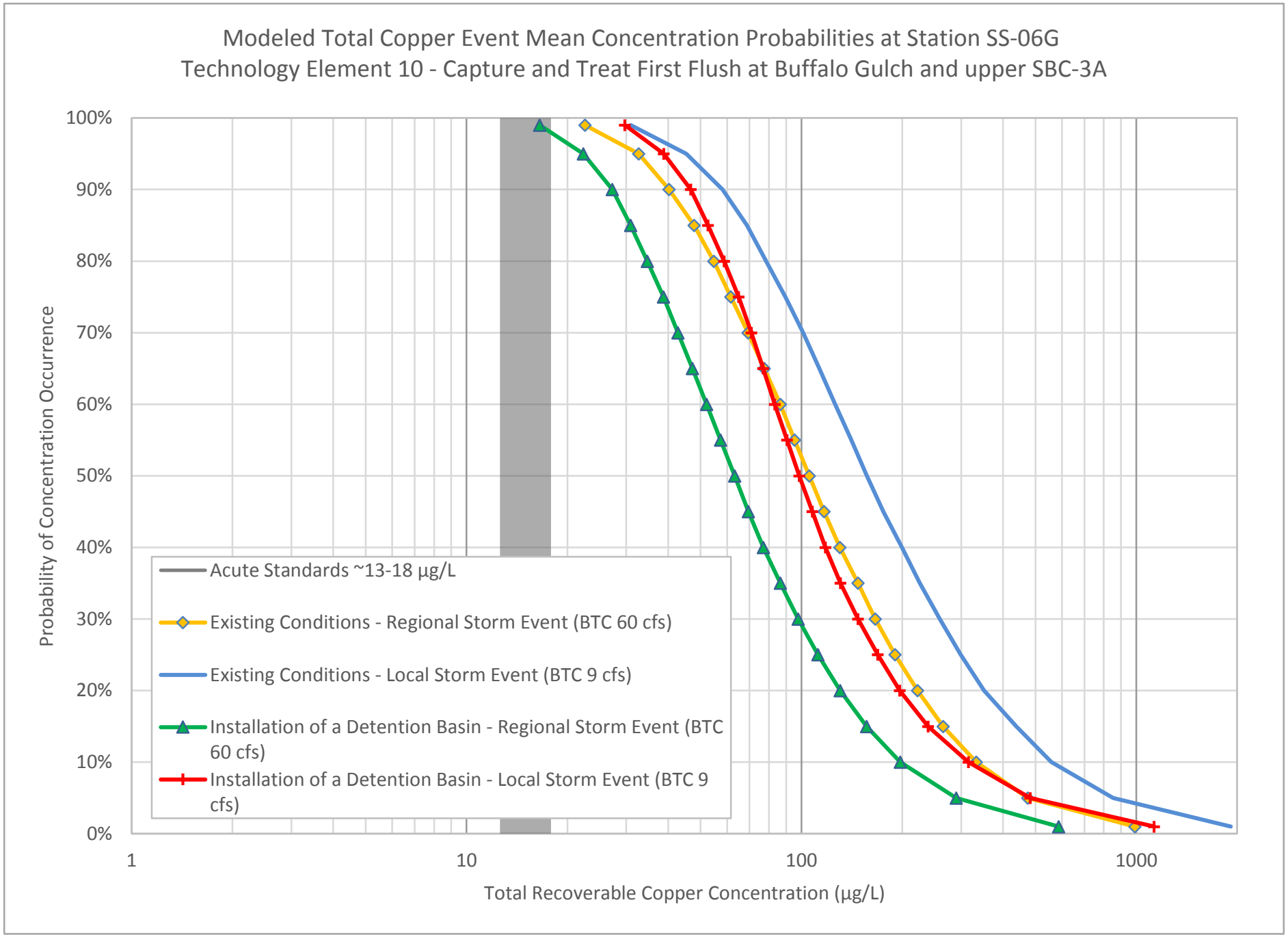


Figure 7-23
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

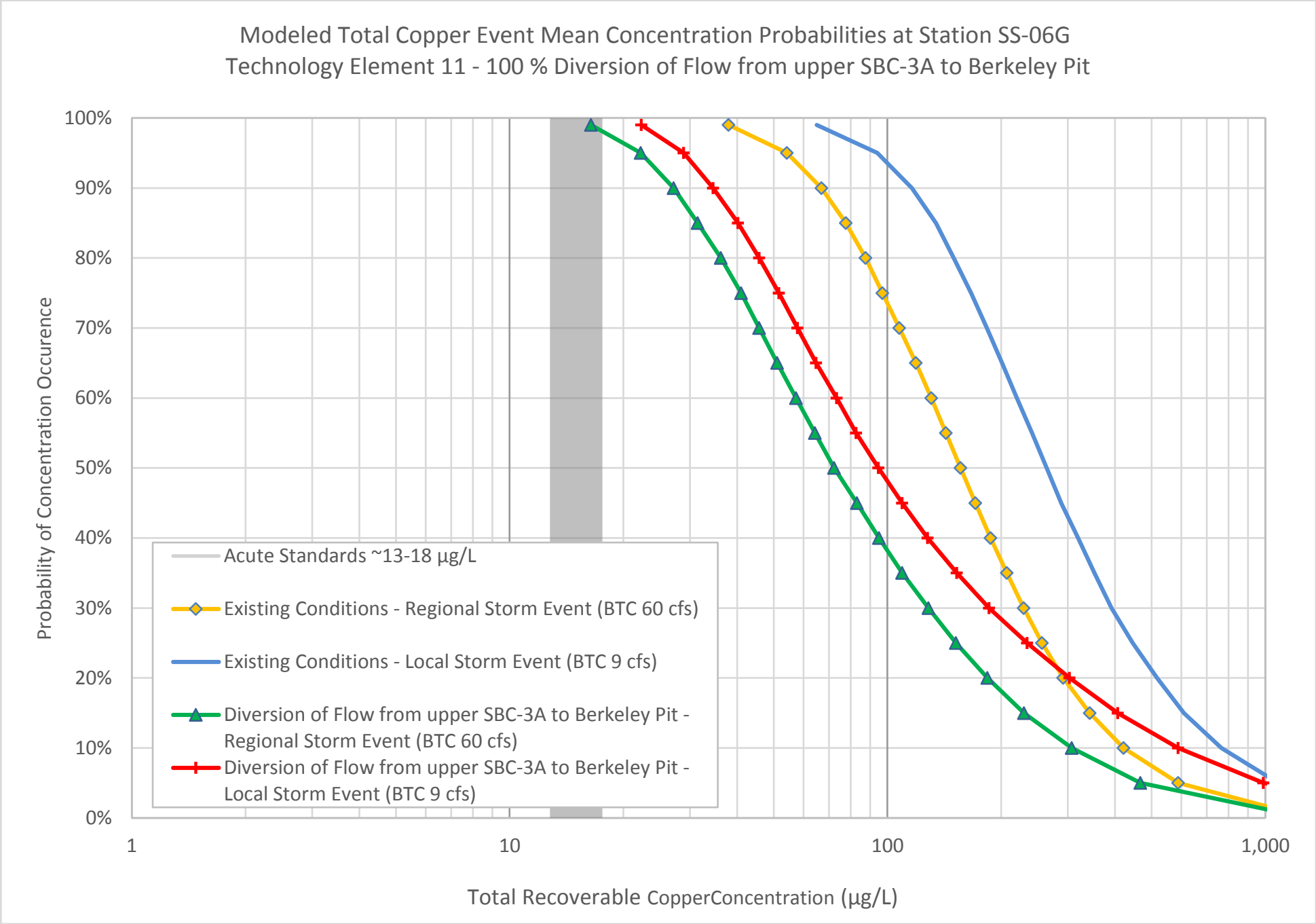


Figure 7-24
Event Mean Concentration Results

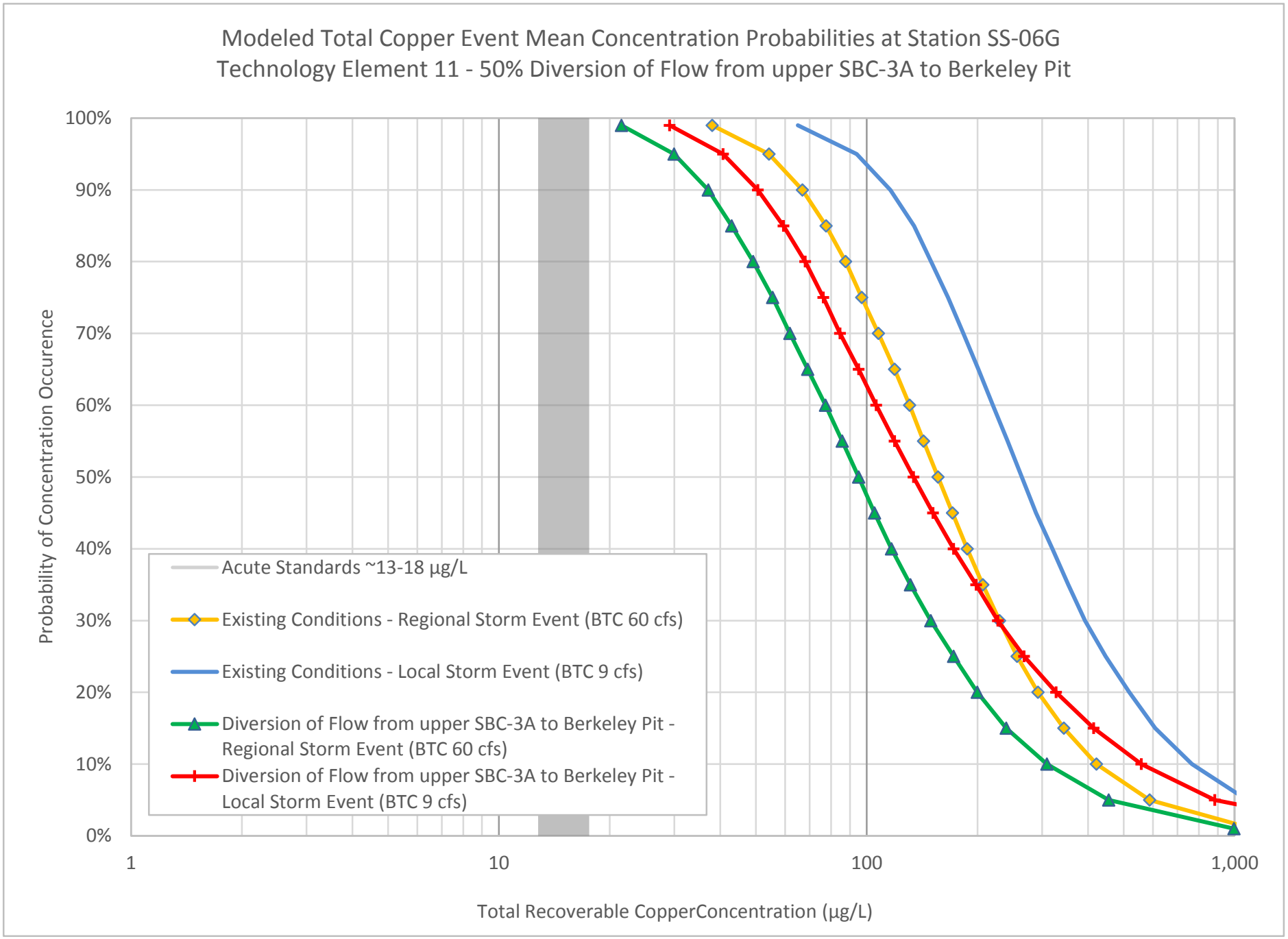


Figure 7-25
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

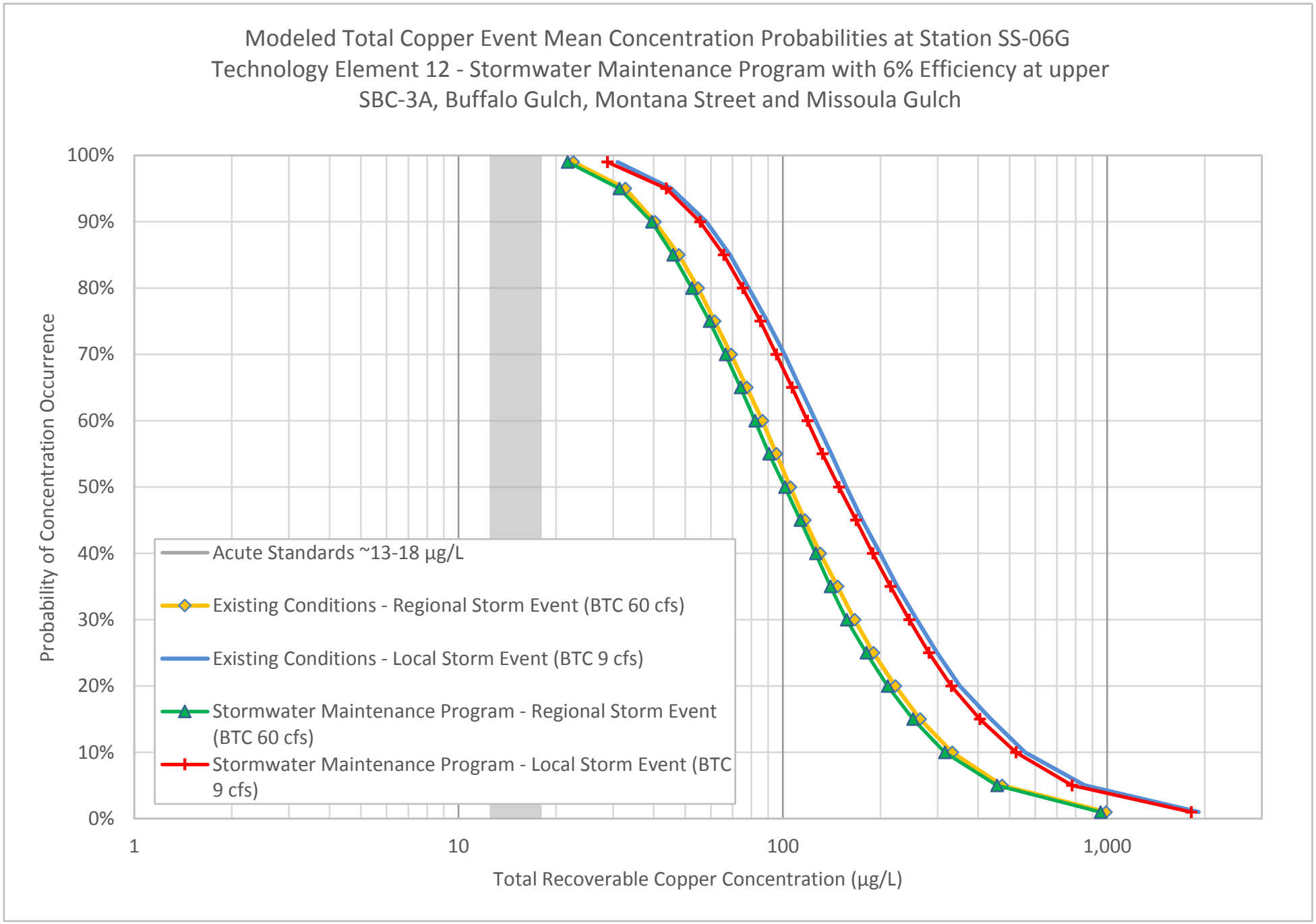


Figure 7-26
Event Mean Concentration Results

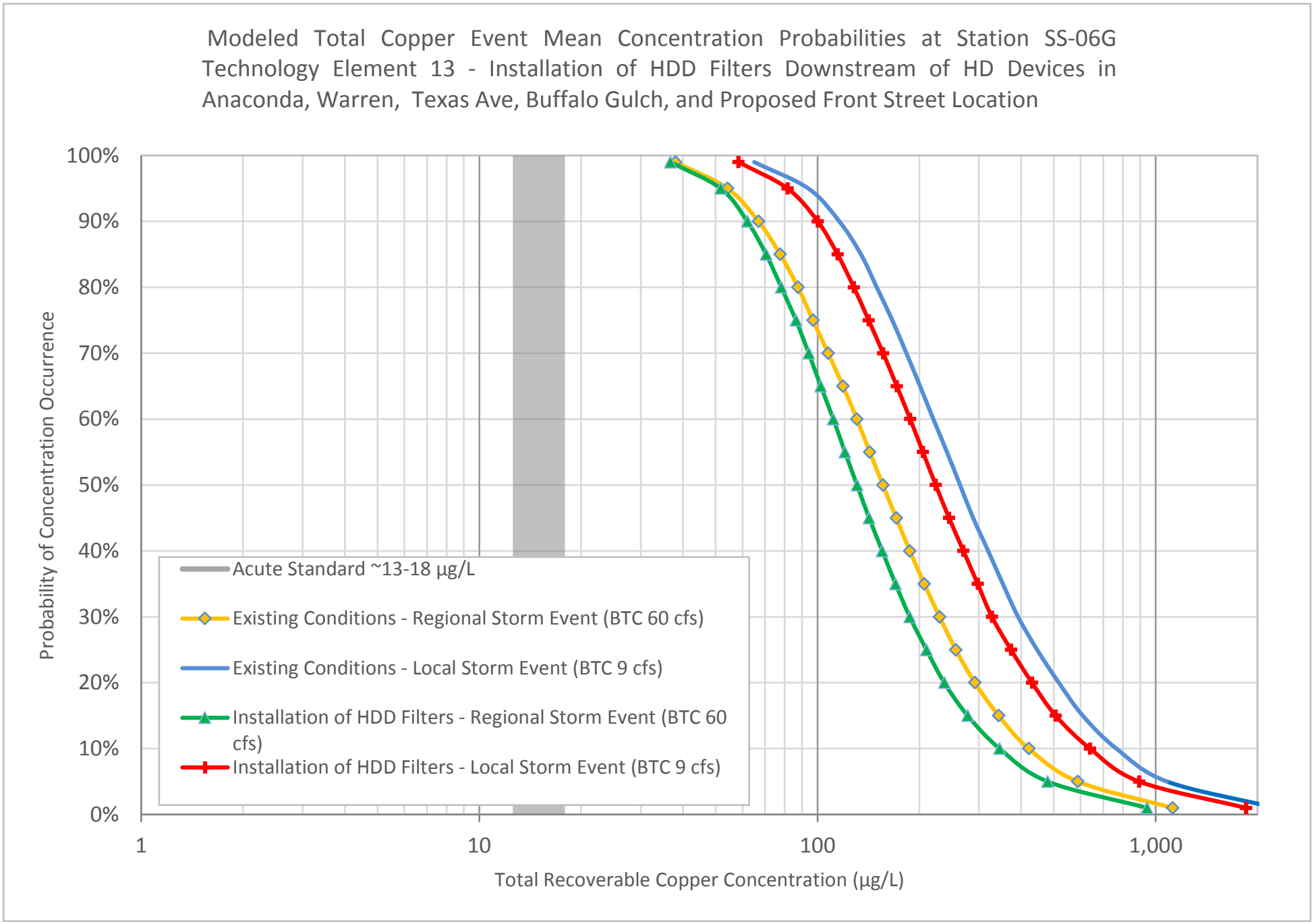


Figure 7-27
Event Mean Concentration Results

Technology Element 14 a

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Combined Effective Efficiency for each outlet =	**15.4%**
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
4	Catch basins in BG-01	70%	25.4%	59.2%
4	Catch basins in upper SBC	70%	25.4%	59.2%
			Total Combined Effective Efficiency at BG-01 =	**74.6%**
			Total Combined Effective Efficiency at upper SBC-3A =	**74.6%**

Technology Element 14 b

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Total Combined Effective Efficiency at all outlets =	**15.4%**
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
8	Bioretention in BG-01	90%	8.5%	76.1%
9	Bioretention in upper SBC	90%	8.5%	76.1%
			Total Combined Effective Efficiency at BG-01 =	**91.5%**
			Total Combined Effective Efficiency at upper SBC-3A =	**91.5%**

Technology Element 14 c

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Combined Effective Efficiency for each outlet =	**15.4%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	80.7%	3.9%
8	Sliplining Missoula Gulch (MG-01)	3.0%	82.1%	2.5%
8	Sliplining Texas, Warren, Locust** (upper SBC watershed)	1.6%	83.2%	1.4%
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
4	Catch basins in BG-01	70%	24.2%	56.5%
4	Catch basins in upper SBC	70%	25.0%	58.3%
			Total Combined Effective Efficiency at BG-01 =	**75.8%**
			Total Combined Effective Efficiency at upper SBC-3A =	**75.0%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

Technology Element 14 d

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Total Combined Effective Efficiency at all outlets =	**15.4%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	80.7%	3.9%
8	Sliplining Missoula Gulch (MG-01)	3.0%	82.1%	2.5%
8	Sliplining Texas, Warren, Locust** (upper SBC watershed)	1.6%	83.2%	1.4%
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
8	Bioretention in BG-01	90%	8.1%	72.6%
9	Bioretention in upper SBC	90%	8.3%	74.9%
			Total Combined Effective Efficiency at BG-01 =	**91.9%**
			Total Combined Effective Efficiency at upper SBC-3A =	**91.7%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

Technology Element 15 a

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Total Combined Effective Efficiency at all outlets =	**15.4%**
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
4	Catch basin in BG-01	70%	25.4%	59.2%
			Total Combined Effective Efficiency at BG-01 =	**74.6%**

Technology Element 15 b

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Total Combined Effective Efficiency at all outlets =	**15.4%**
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
9	Bioretention basin in BG-01	90%	8.5%	76.1%
			Total Combined Effective Efficiency at BG and upper SBC-3A =	**91.5%**

Technology Element 15 c

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Total Combined Effective Efficiency at all outlets =	**15.4%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	80.7%	3.9%
8	Sliplining Missoula Gulch (MG-01)	3.0%	82.1%	2.5%
8	Sliplining Texas, Warren, Locust** (upper SBC watershed)	N/A (upper SBC Diverted)	N/A	N/A
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
4	Catch basin in BG-01	70%	24.2%	56.5%
			Total Combined Effective Efficiency at BG-01 =	**75.8%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

Technology Element 15 d

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance	6%	84.6%	5.4%
			Total Combined Effective Efficiency at all outlets =	**15.4%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	80.7%	3.9%
8	Sliplining Missoula Gulch (MG-01)	3.0%	82.1%	2.5%
8	Sliplining Texas, Warren, Locust** (upper SBC watershed)	N/A (upper SBC Diverted)	N/A	N/A
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
9	Bioretention basin in BG-01	90%	8.1%	72.6%
			Total Combined Effective Efficiency at BG-01 =	**91.9%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

*The Hydrodynamic Device (HDD) efficiency is 47% for water that passes through it. Per HydroCAD model, 9.8% of total watershed runoff volume flows through a HDD before the HDD is full of sediment and efficiency is 0. 9.8% of water treated to 47% efficiency equates to 4.6% watershed wide efficiency. This is an assumption, but necessary to allow for efficiency value to be applied at "end of pipe" where the model is based.

**The efficiency for TE 8 - Sliplining of Texas Avenue, Warren Avenue, and Locust Street, is calculated using a flow weighted average for the entire upper Silver Bow Creek (upper SBC) watershed. This is to allow the upper SBC discharge point to be the input to the model, which is more accurate.

Notes: 1. The assumption that is made for the purpose of these calculations is that the contaminants are conservative from the top of the watershed to the outlet and distributted uniformly over the watershed.

2. The diversion of Buffalo Gulch (BG-01) at Porphyry Street (via Belmont Diversion) and the upper SBC to the Berkeley Pit are reflected in the model by a modification of the hydrographs, and therefore do not have an efficiency % associated with them. The volume of water associated with each diversion is removed from the hydrographs in the model.

Figure 7-28
High Efficiency Combination Calculations

Technology Element 14 a

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Combined Effective Efficiency for each outlet =		**4.0%**
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
4	Catch basins in BG-01	5%	91.2%	4.8%
4	Catch basins in upper SBC	5%	91.2%	4.8%
		Total Combined Effective Efficiency at BG-01 =		**8.8%**
		Total Combined Effective Efficiency at upper SBC-3A =		**8.8%**

Technology Element 14 b

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Total Combined Effective Efficiency at all outlets =		**4.0%**
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
8	Bioretention in BG-01	10%	86.4%	9.6%
9	Bioretention in upper SBC	10%	86.4%	9.6%
		Total Combined Effective Efficiency at BG-01 =		**13.6%**
		Total Combined Effective Efficiency at upper SBC-3A =		**13.6%**

Technology Element 14 c

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Combined Effective Efficiency for each outlet =		**4.0%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	91.6%	4.4%
8	Sliplining Missoula Gulch (MG-01)	2.0%	94.1%	1.9%
8	Sliplining Texas, Warren, Locust (upper SBC watershed)**	1.1%	95.0%	1.1%
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
4	Catch basins in BG-01	5%	87.0%	4.6%
4	Catch basins in upper SBC	5%	90.2%	4.7%
		Total Combined Effective Efficiency at BG-01 =		**13.0%**
		Total Combined Effective Efficiency at upper SBC-3A =		**9.8%**
		Total Combined Effective Efficiency at Missoula Gulch =		**5.9%**

Technology Element 14 d

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	N/A
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Total Combined Effective Efficiency at all outlets =		**4.0%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	91.6%	4.4%
8	Sliplining Missoula Gulch (MG-01)	2.0%	94.1%	1.9%
8	Sliplining Texas, Warren, Locust (upper SBC watershed)**	1.1%	95.0%	1.1%
10	Capture and Treat First Flush of BG-01 and upper SBC	Flow diversion (100%)	N/A	N/A
8	Bioretention in BG-01	10%	82.5%	9.2%
9	Bioretention in upper SBC	10%	85.5%	9.5%
		Total Combined Effective Efficiency at BG-01 =		**17.5%**
		Total Combined Effective Efficiency at upper SBC-3A =		**14.5%**
		Total Combined Effective Efficiency at Missoula Gulch =		**5.9%**

Technology Element 15 a

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Total Combined Effective Efficiency at all outlets =		**4.0%**
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
4	Catch basin in BG-01	5%	91.2%	4.8%
		Total Combined Effective Efficiency at BG-01 =		**8.8%**

Technology Element 15 b

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Total Combined Effective Efficiency at all outlets =		**4.0%**
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
9	Bioretention basin in BG-01	10%	86.4%	9.6%
		Total Combined Effective Efficiency at BG and upper SBC-3A =		**13.6%**

Technology Element 15 c

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Total Combined Effective Efficiency at all outlets =		**4.0%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	4.6%	91.6%	4.4%
8	Sliplining Missoula Gulch (MG-01)	2.0%	94.1%	1.9%
8	Sliplining Texas, Warren, Locust (upper SBC watershed)**	N/A (upper SBC Diverted)	N/A	N/A
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
4	Catch basin in BG-01	5%	87.0%	4.6%
		Total Combined Effective Efficiency at BG-01 =		**13.0%**
		Total Combined Effective Efficiency at Missoula Gulch =		**5.9%**

Technology Element 15 d

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG-01 at Porphyry Street	Flow diversion (100%)	N/A	0.0%
7	Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance	1%	96.0%	1.0%
		Total Combined Effective Efficiency at all outlets =		**4.0%**
6	Hydrodynamic Device in Front Street* (Buffalo Gulch watershed)	5%	91.6%	4.4%
8	Sliplining Missoula Gulch (MG-01)	2.0%	94.1%	1.9%
8	Sliplining Texas, Warren, Locust (upper SBC watershed)**	N/A (upper SBC Diverted)	N/A	N/A
11	Diversions of upper SBC to Berkeley Pit	Flow diversion (100%)	N/A	N/A
10	Capture and Treat First Flush in BG-01	Flow diversion (100%)	N/A	N/A
9	Bioretention basin in BG-01	10%	82.5%	9.2%
		Total Combined Effective Efficiency at BG-01 =		**17.5%**
		Total Combined Effective Efficiency at Missoula Gulch =		**5.9%**

*The Hydrodynamic Device efficiency is 47% for water that passes through it. Per HydroCAD model, 9.8% of total watershed runoff volume flows through HDD before the HDD is full of sediment and efficiency is 0. 9.8% of water treated to 47% equates to 4.6% watershed wide efficiency. This is an assumption, but necessary to allow for efficiency value to be applied at "end of pipe" where the model is based.

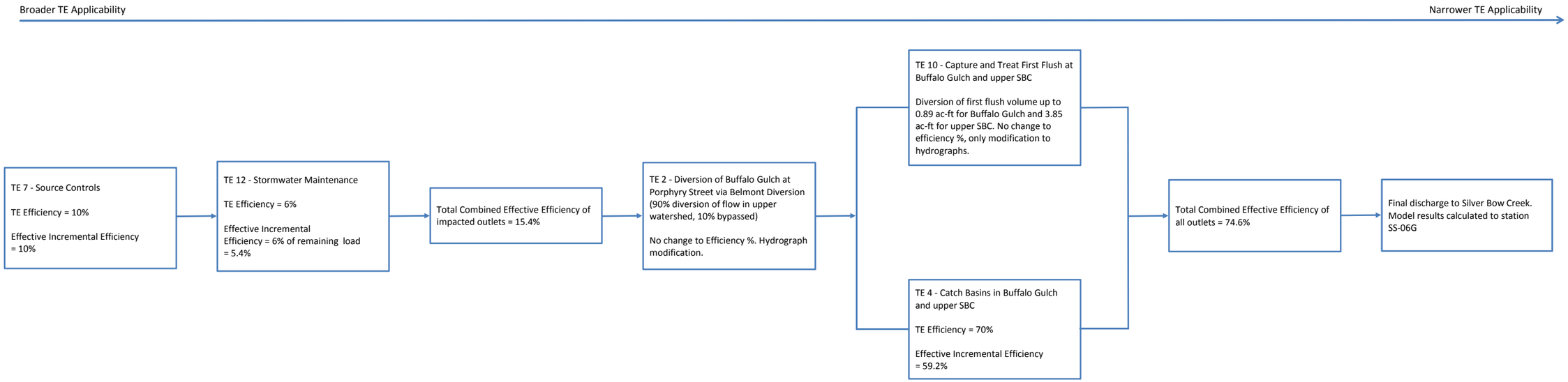
**The efficiency for TE 8 - Sliplining of Texas Avenue, Warren Avenue, and Locust Street, is calculated using a flow weighted average for the entire upper Silver Bow Crekk (upper SBC) watershed. This is to allow the upper SBC discharge point to be the input to the model, which is more accurate.

Notes: 1. The assumption that is made for the purpose of these calculations is that the contaminants are conservative from the top of the watershed to the outlet and distributted uniformly over the watershed.

2. The diversion of Buffalo Gulch (BG-01) at Porphyry Street (via Belmont Diversion) and the upper SBC to the Berkeley Pit are reflected in the model by a modification of the hydrographs, and therefore do not have an efficiency % associated with them. The volume of water associated with each diversion is removed from the hydrographs in the model.

Figure 7-29
Low Efficiency Combination Calculations

Technology Element 14a (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)



Technology Element 14b (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)

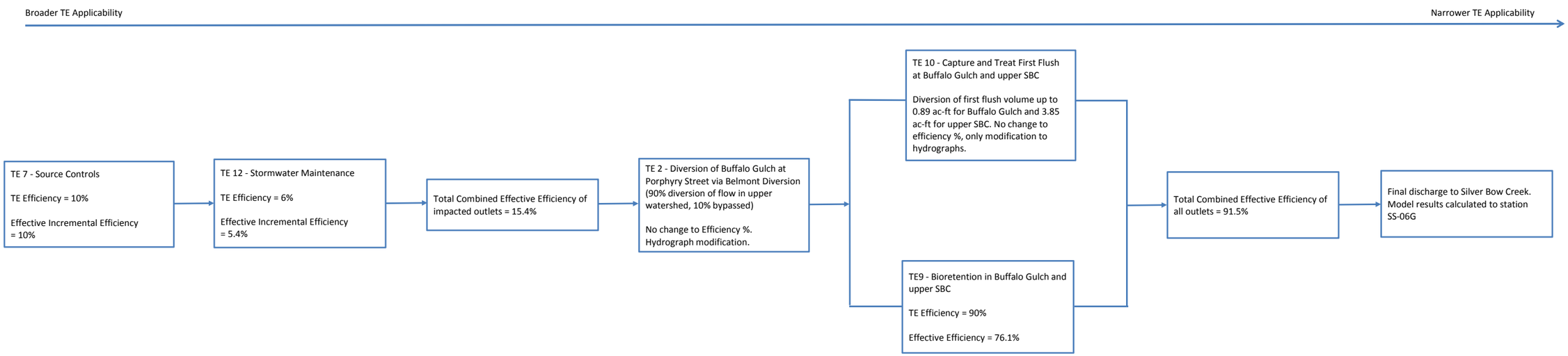
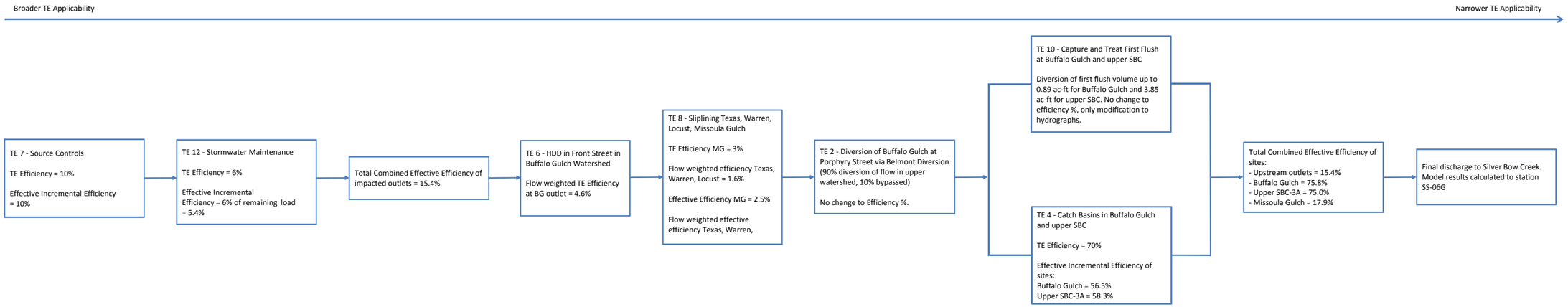


Figure 7-30
TE 14 a and b Flowcharts

Technology Element 14c (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)



Technology Element 14d (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)

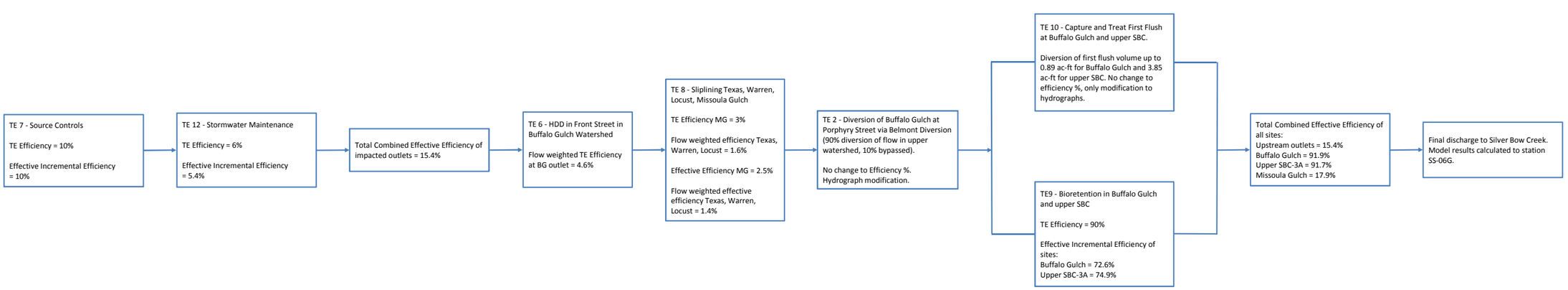
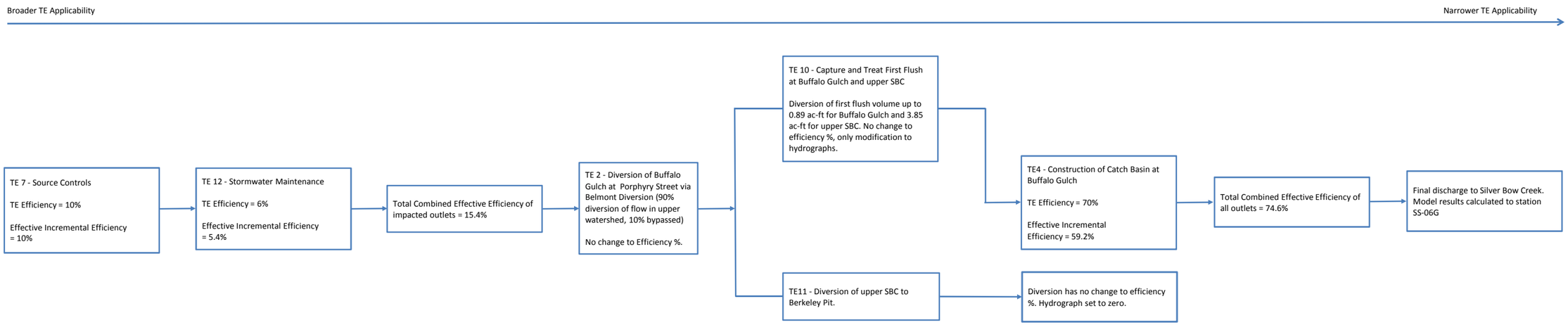


Figure 7-31
TE 14 c and d Flowcharts

Technology Element 15a (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)



Technology Element 15b (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)

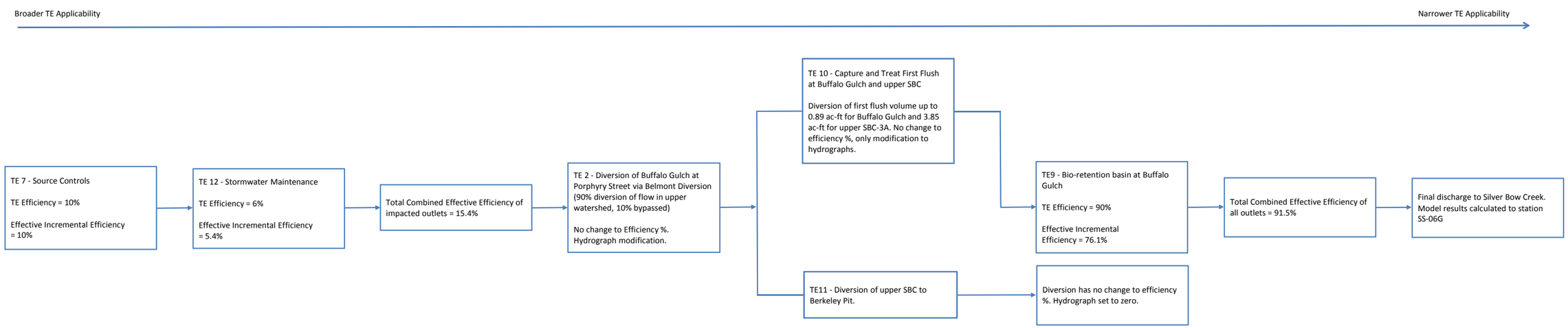
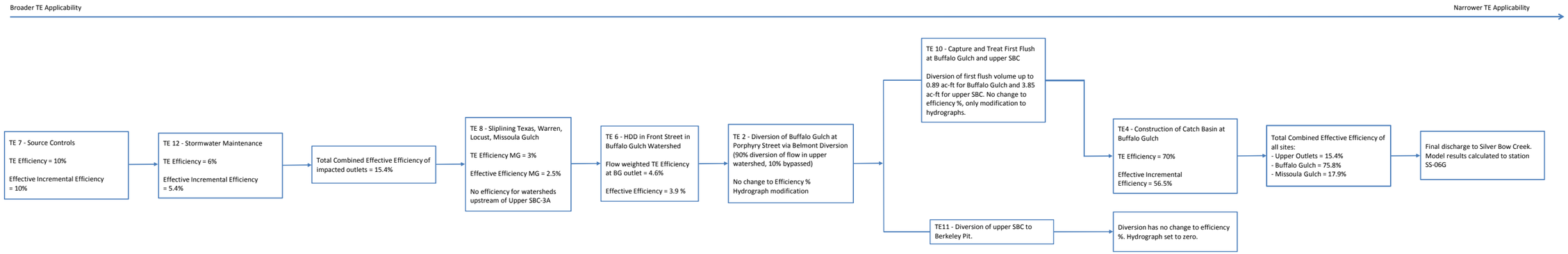


Figure 7-32
TE 15 a and b Flowcharts

Techology Element 15c (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)



Technology Element 15d (The flowcharts present high efficiency values, but it is noted the low efficiency would look the same but with different final efficiencies)

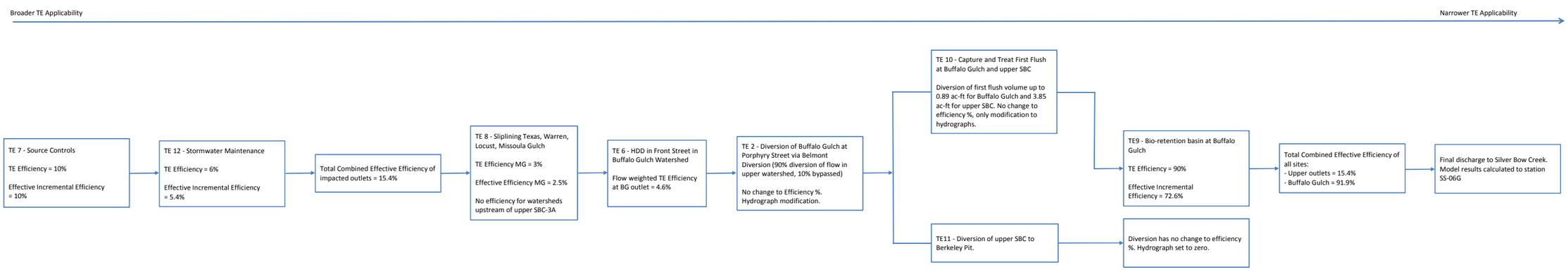


Figure 7-33
TE 15 c and d Flowcharts

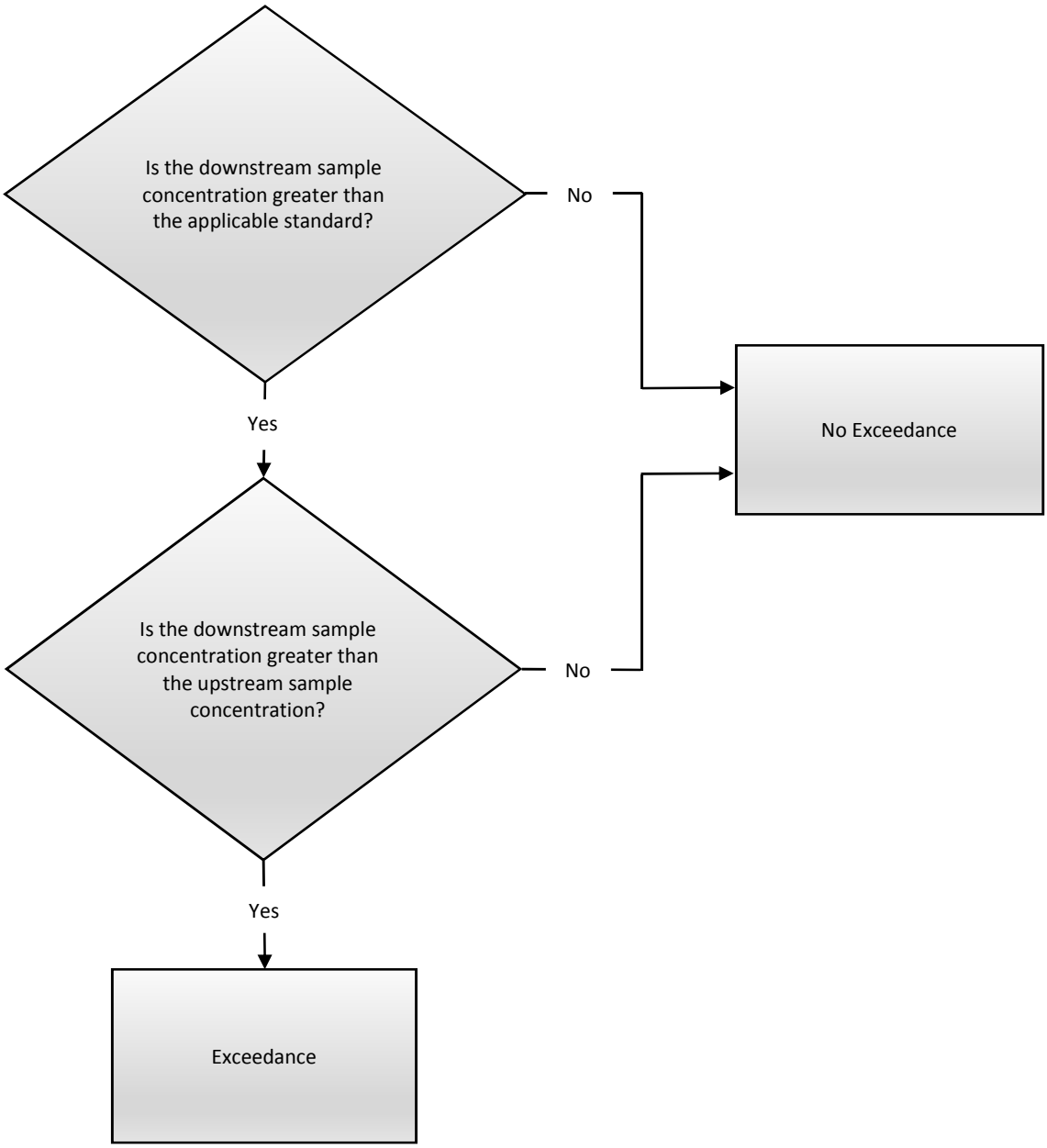


Figure 7-34
Upstream Accounting Method

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Z:\gis\Public\Butte\ MXD\Proposed Surface Water TIZone 2 rev 20200106.mxd

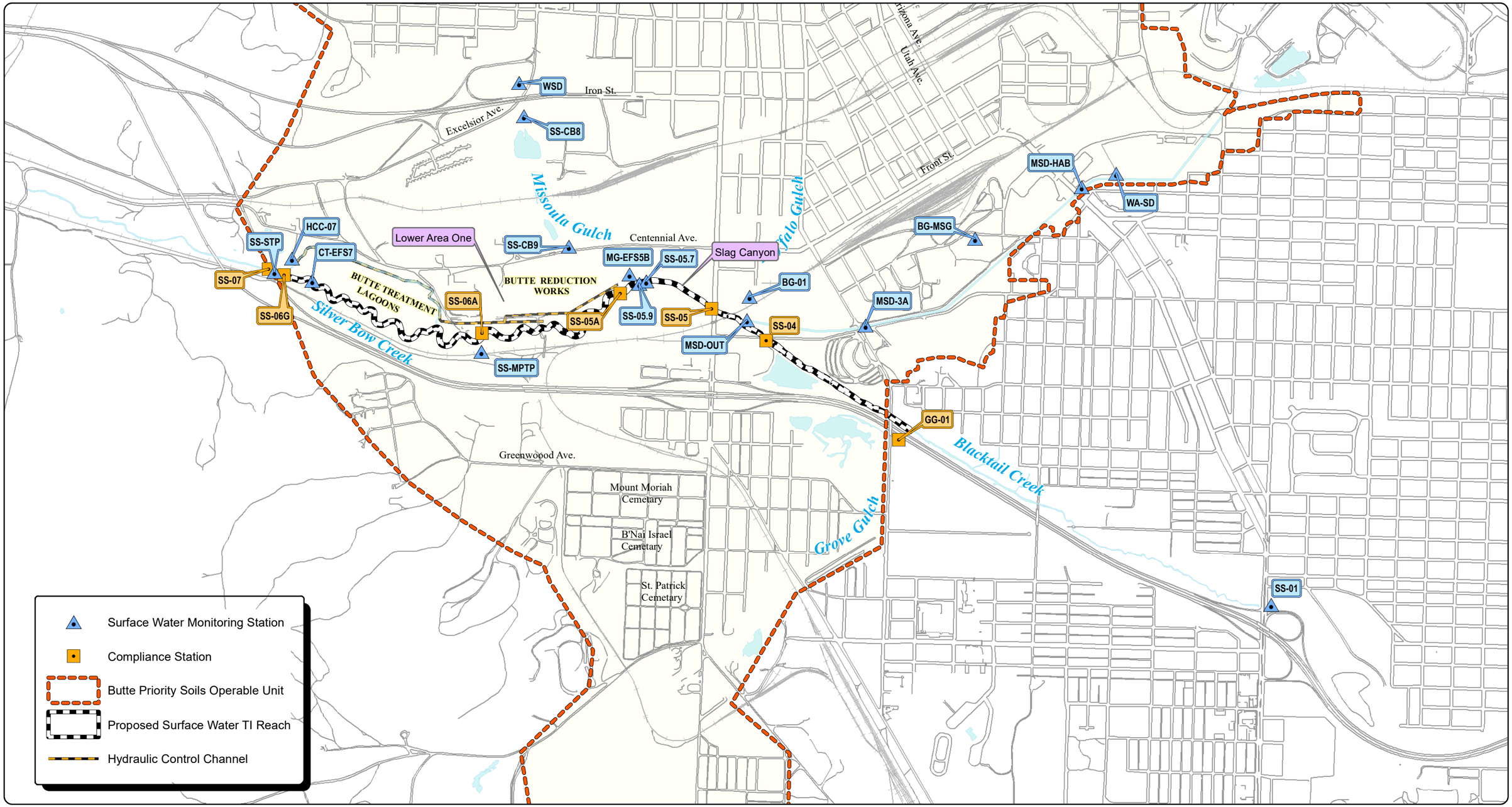


Figure 8-1
Proposed Surface Water Technical Impracticability Zone
Surface Water Technical Impracticability Evaluation
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

0 1,000 2,000 3,000 Feet

N W E S

CDM Smith

APPENDIX A

2008 to 2013 Surface Water Characterization Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site
Butte, Montana
May 2017

Report is available at the following link: https://semspub.epa.gov/src/document/08/1817951

APPENDIX B

Flow Durations Observed in Blacktail Creek between October 2011 and September 2015

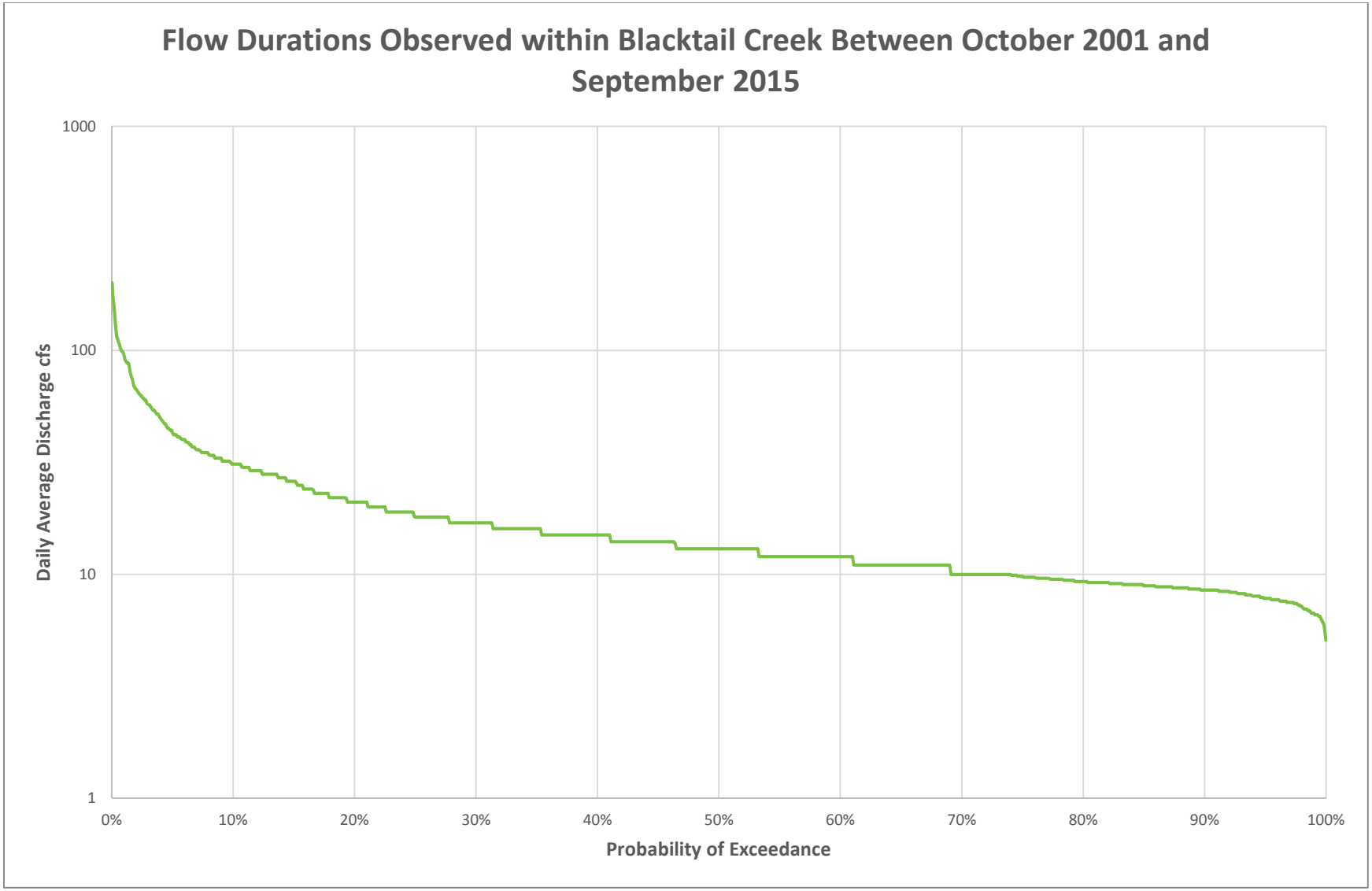


Figure B-1

Flow Durations Observed within Blacktail Creek between October 2001 and September 2015

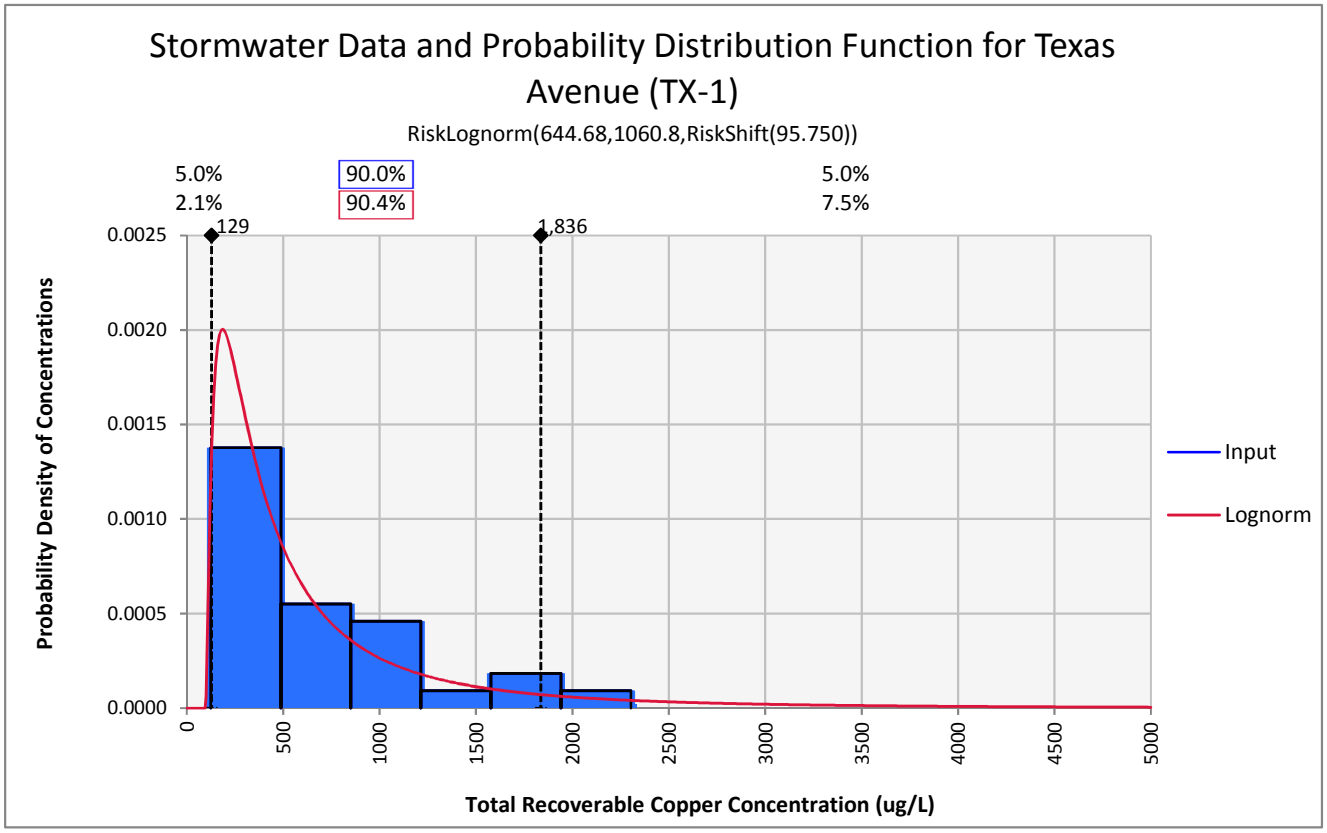
Surface Water TI Report

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

APPENDIX C1

Probability Distribution Functions

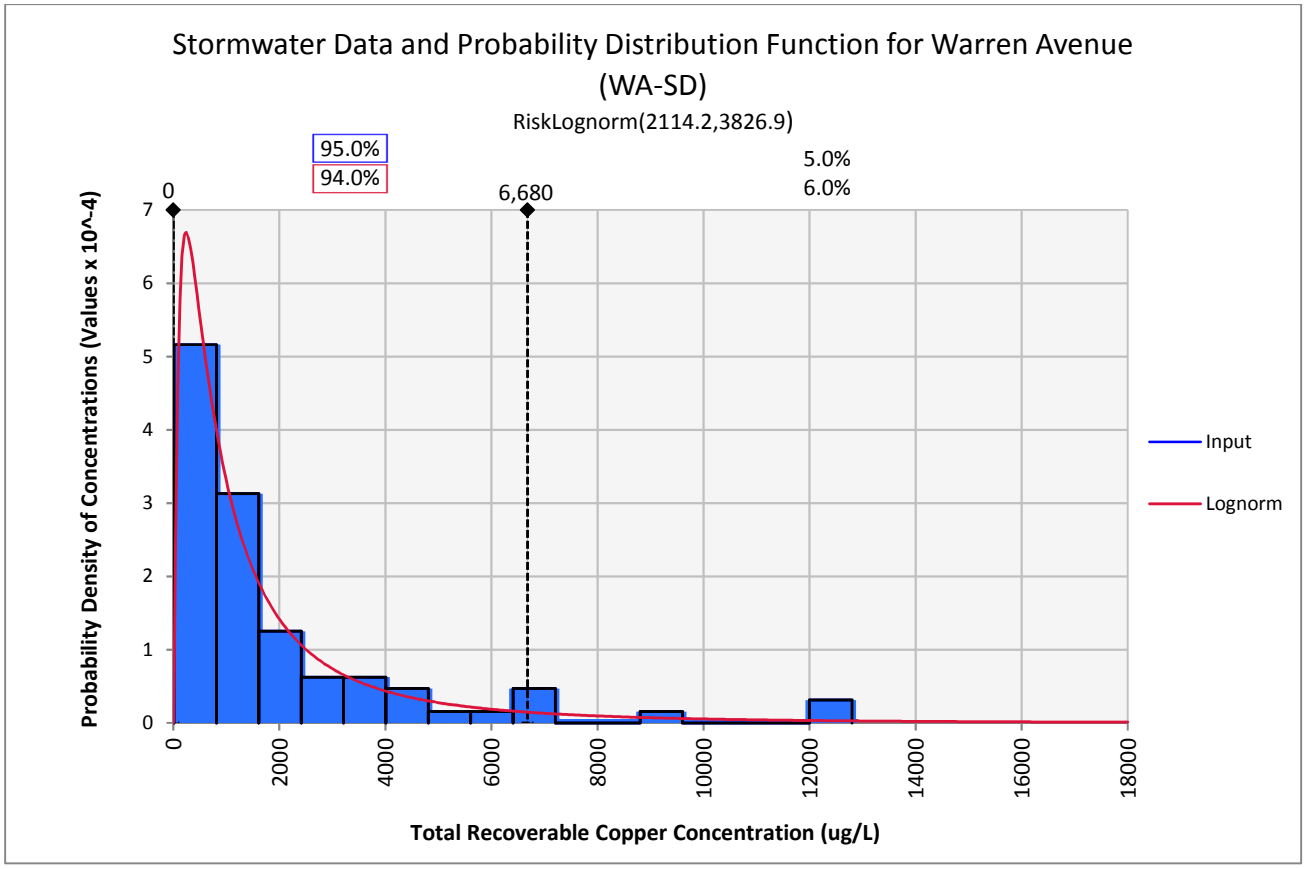


Number	30
Maximum	2303
Minimum	125
Mean	672
Median	494

Event Mean Concentration – Raw Data

274	972	125
531	457	129
701	2303	190
326	248	208
581	1131	340
1013	1613	1000
580	290	1100
842	618	255
155	200	365
1558	220	1836

Figure C-1
Stormwater Data and Probability Function for Texas Avenue (TX-1)

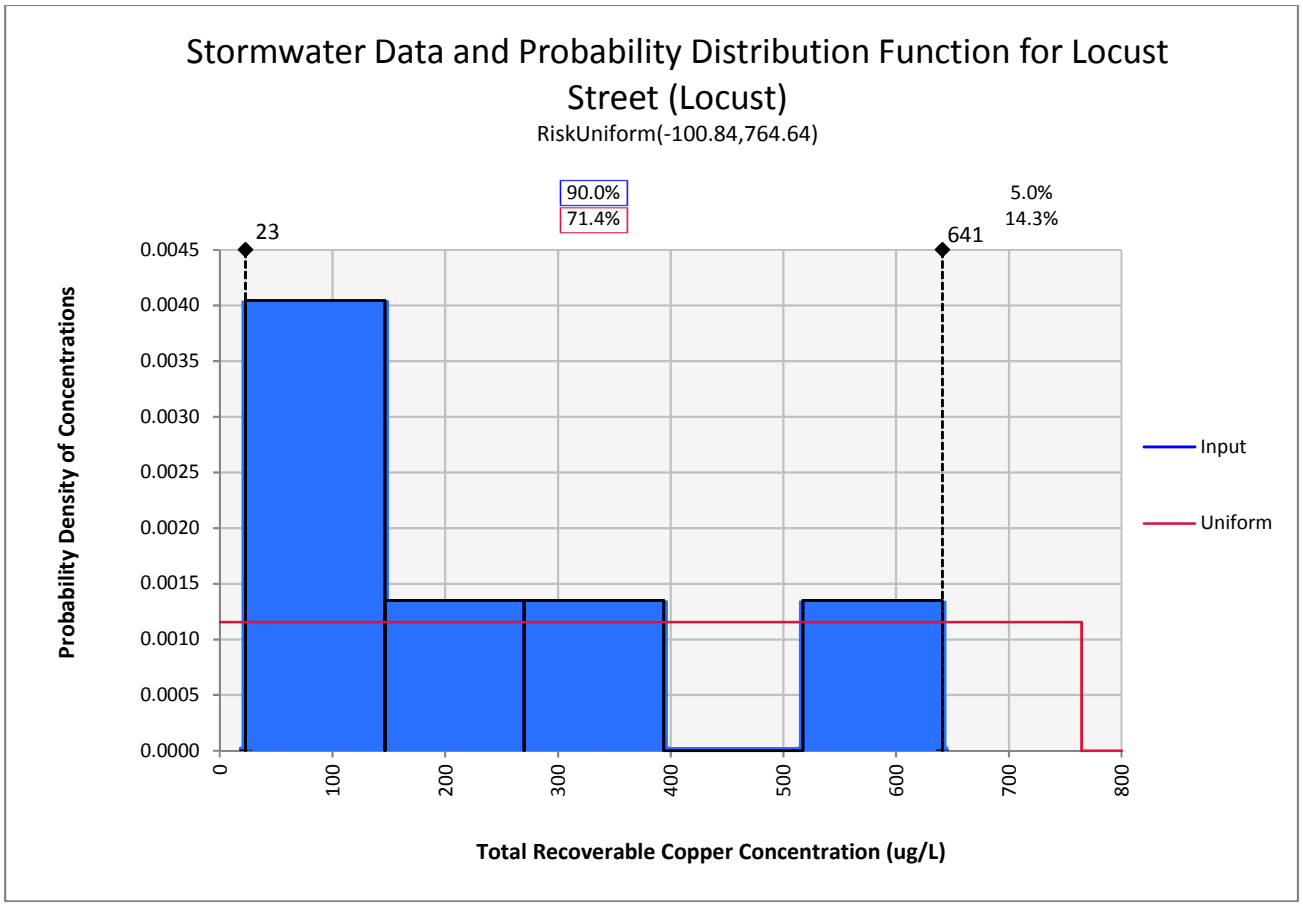


Number	80
Maximum	12800
Minimum	14
Mean	1953.8
Median	1100

Event Mean Concentration – Raw data

1810	1700	2300	430	4000	800	210	1000
6680	290	780	1400	230	1100	1700	190
1590	319	1200	1100	2500	600	180	540
6900	1300	350	280	2200	1100	410	720
4500	14	760	450	630	300	12200	2500
121	430	560	1900	6300	790	4600	860
59	1000	6600	1600	540	230	360	280
947	4800	12800	1200	3400	500	1700	2000
1190	8900	598	1300	1100	4900	3300	820
1300	420	356	2700	880	2600	1100	4000

Figure C-2
Stormwater Data and Probability Distribution Function for Warren Avenue (WA-SD)

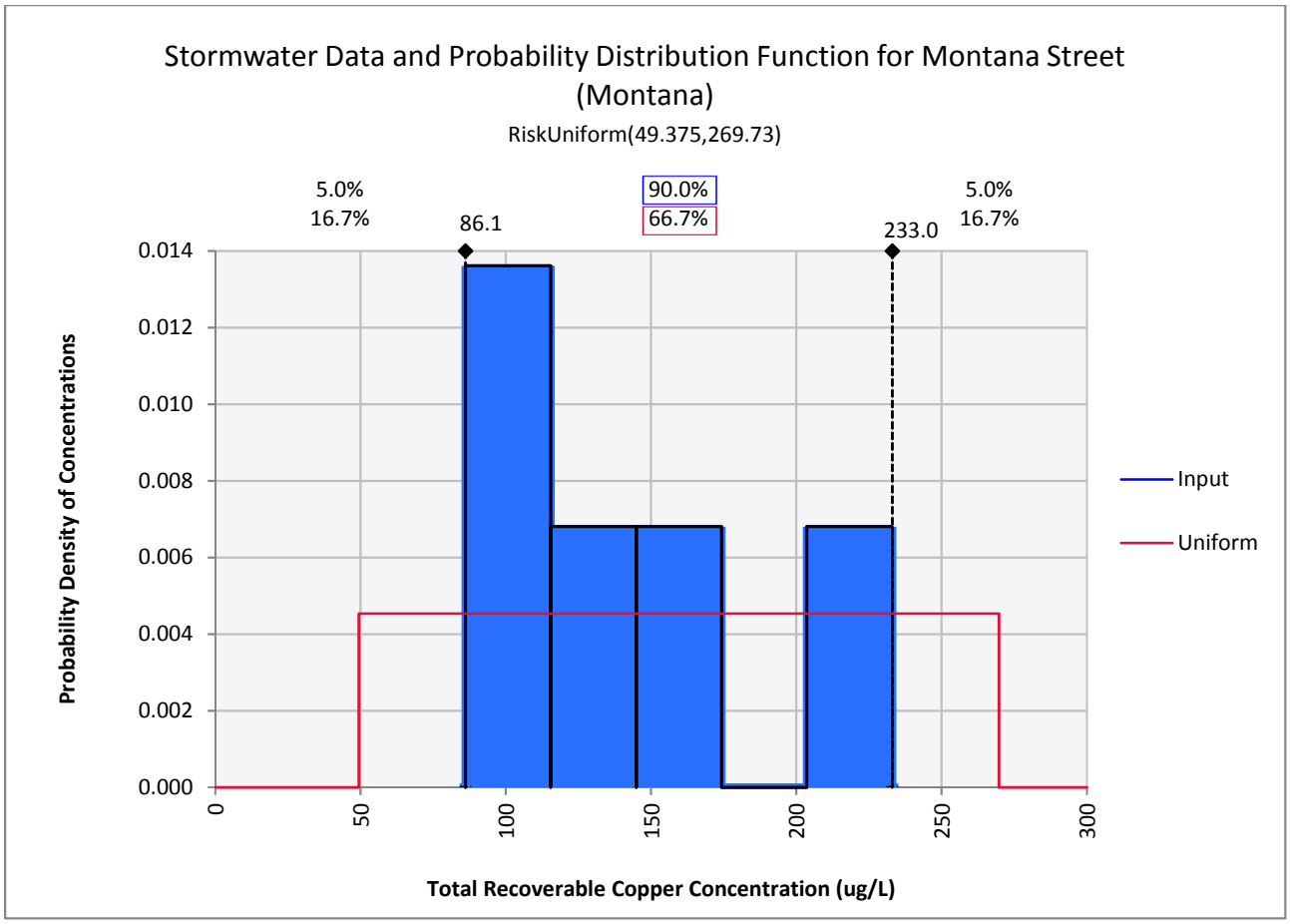


Number	60
Maximum	641
Minimum	22.8
Mean	216.48
Median	140

Event Mean Concentration – Raw data

111
329
641
169
26.1
22.8

Figure C-3
Stormwater Data and Probability Distribution Function for Locust Street (Locust)

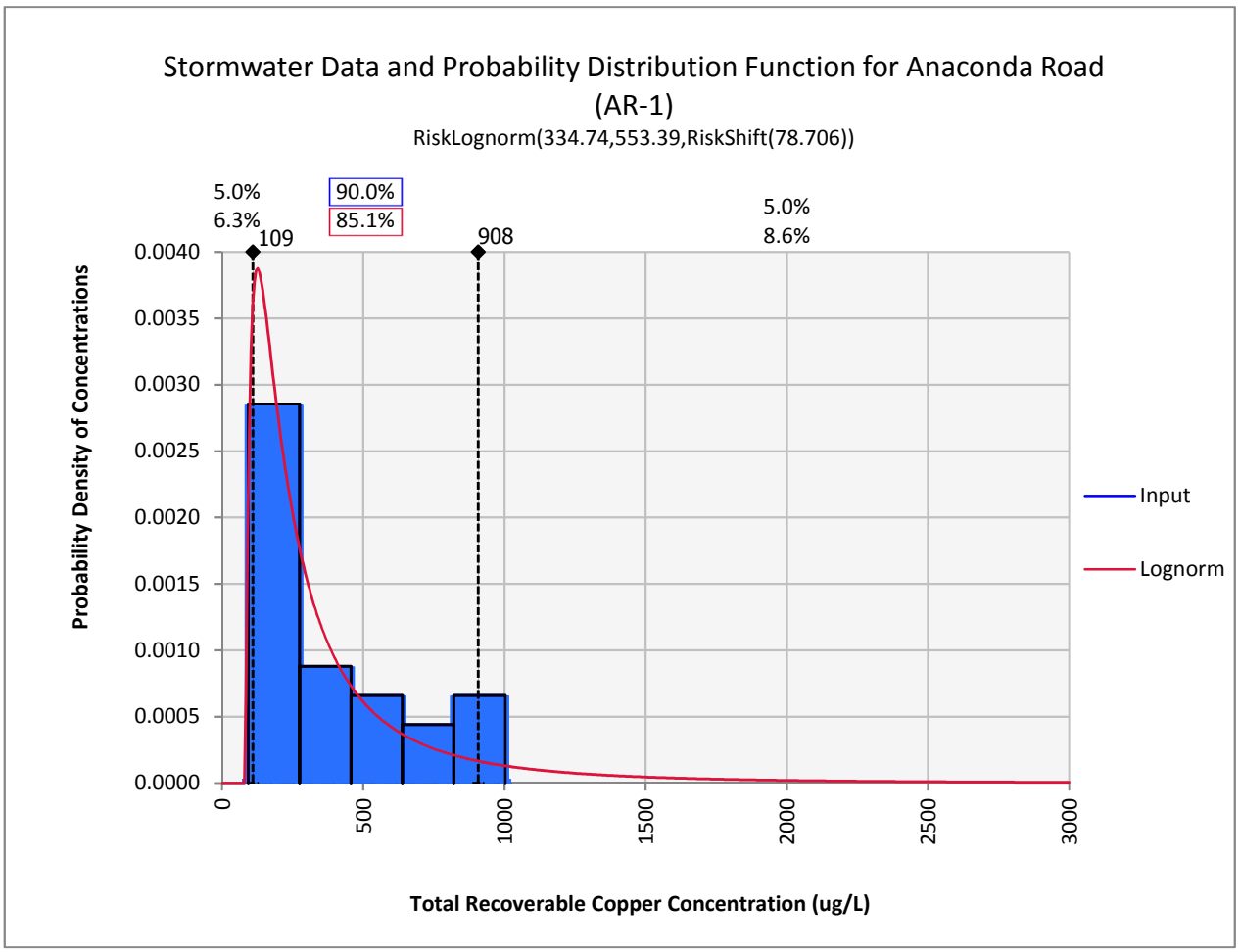


Number	5
Maximum	233
Minimum	86
Mean	145
Median	134

Event Mean Concentration – Raw Data

100
173
233
86.1
134

Figure C-4
Stormwater Data and Probability Function for Montana Street (Montana)

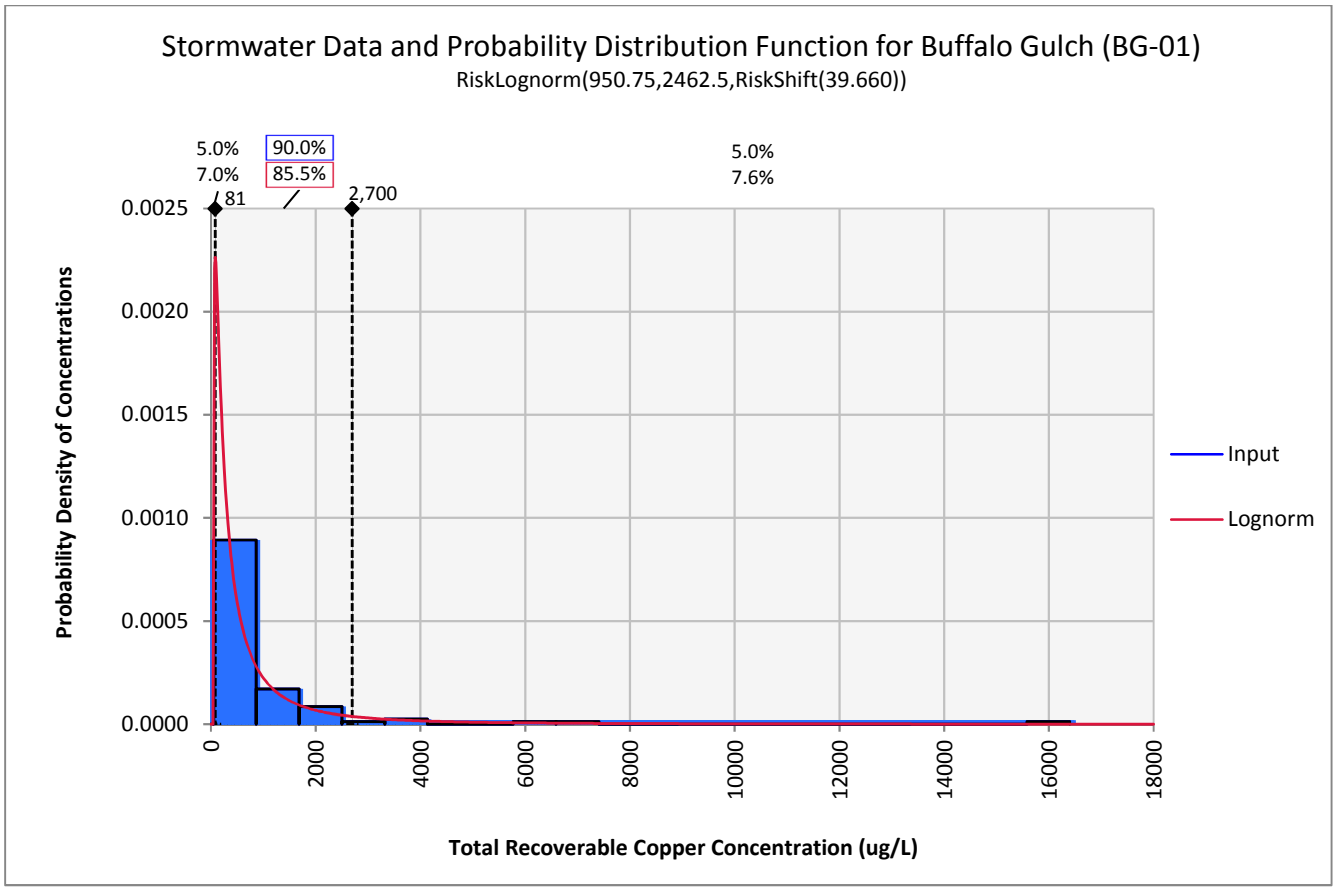


Number	25
Maximum	1003
Minimum	93
Mean	375
Median	241

Event Mean Concentration – Raw Data

550	715	907.5	530	241
376.7	213	352.5	138.8	877
92.8	108.5	186.7	180	283.9
110	445	240	110.4	1002.9
147.5	203.7	457.5	168.5	724.3

Figure C-5
Stormwater Data and Probability Function for Anaconda Road (AR-1)

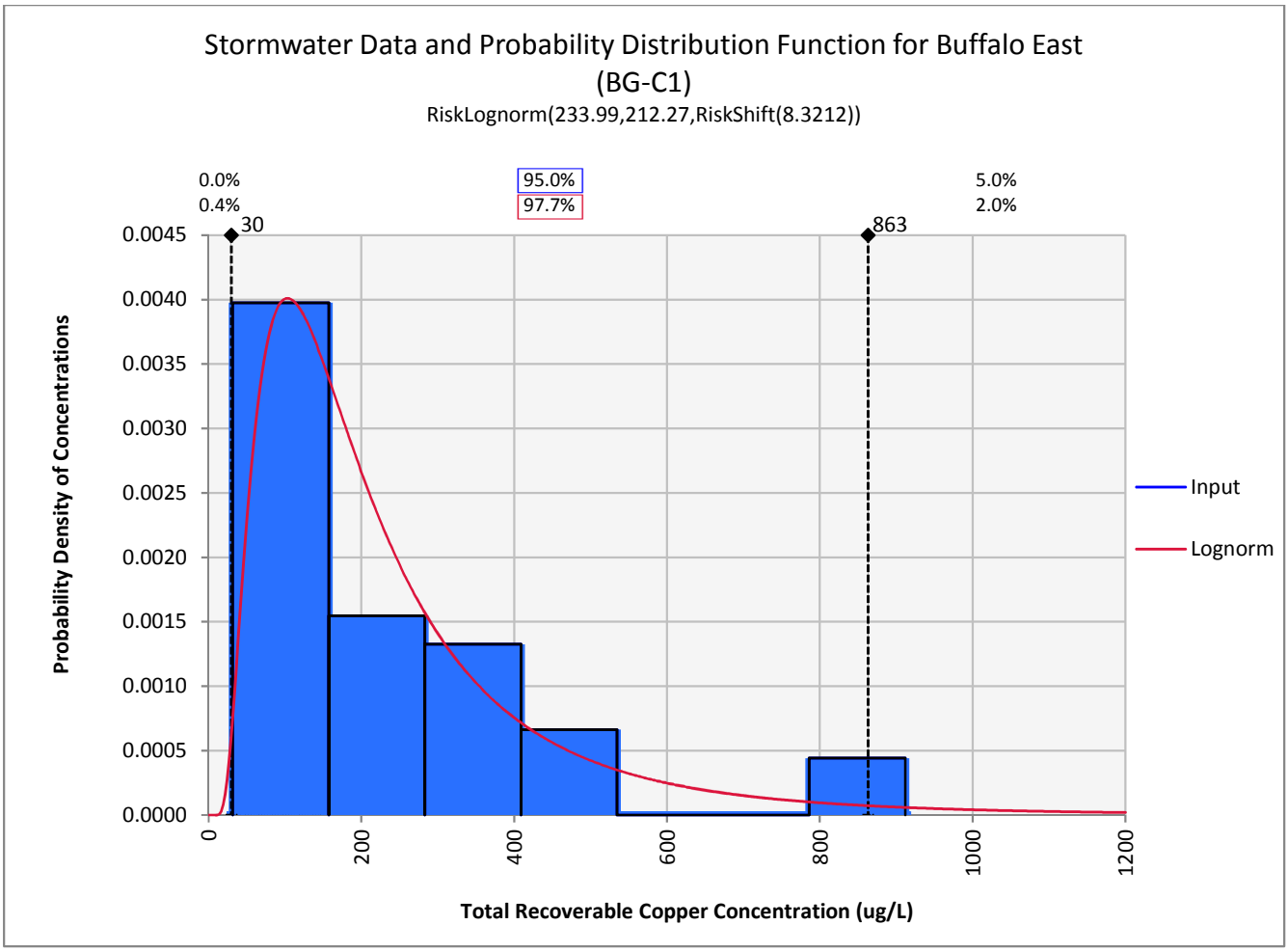


Number	100
Maximum	16400
Minimum	46.5
Mean	942
Median	461

Event Mean Concentration – Raw Data

356	676	610	729	52.5	86	1700	936.6	95.7	91.7
3620	460	1900	260	120	2000	16400	960	245	132
1040	540	690	590	610	1200	1400	120	740	482.9
4000	180	69	750	1400	500	810	320	120.5	123.3
2300	56	1200	284	730	2700	680	520	95.7	46.5
243	160	130	161	1500	100	1200	208.3	85.1	290
730	376	1100	223	760	1700	110	816.7	740	251.3
720	1100	310	88.1	280	730	570	404.3	461.8	100
103	6100	7200	129	1200	220	81	230	1700	336
215	1700	120	95.3	1100	1400	250	120	238	275

Figure C-6
Stormwater Data and Probability Function for Buffalo Gulch (BG-01)

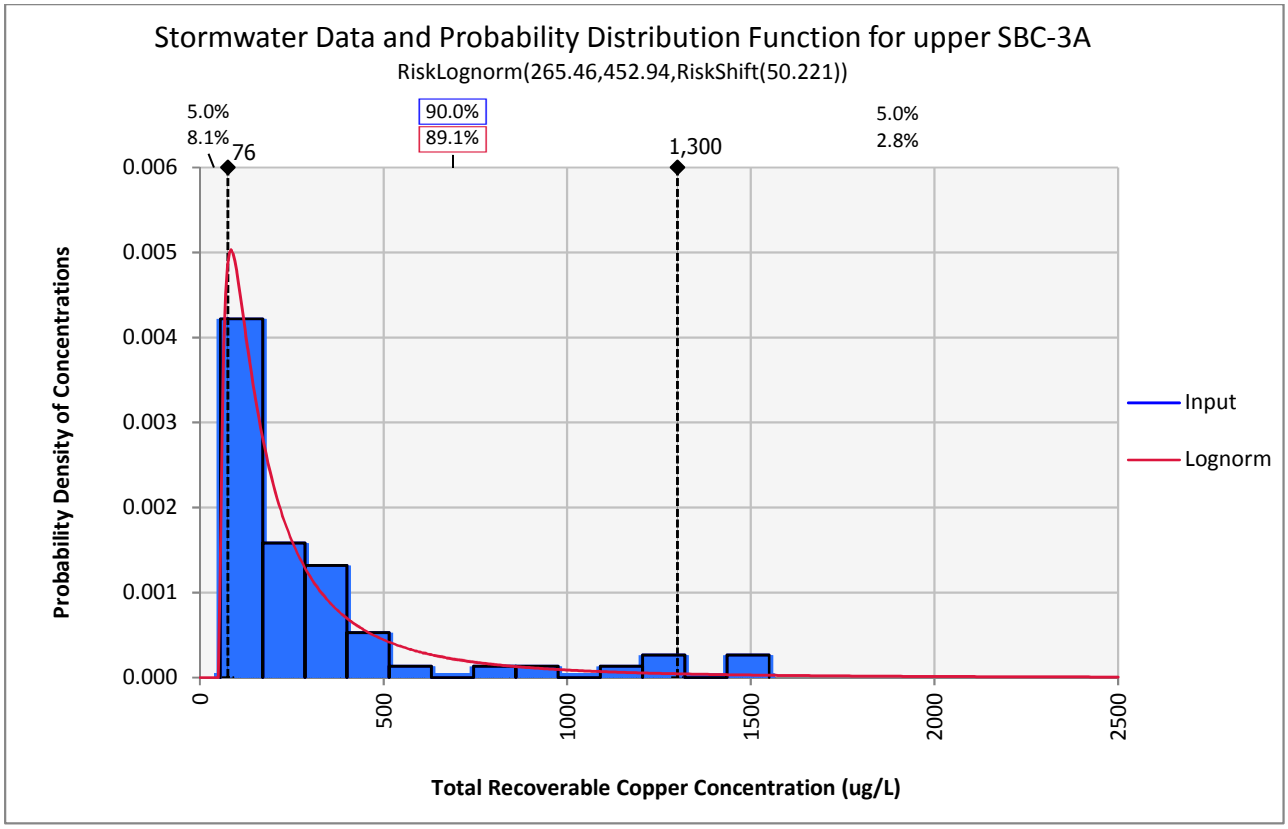


Number	36
Maximum	912
Minimum	31.6
Mean	242
Median	168

Event Mean Concentration – Raw Data

124	117	126	863.3	96	103.2
31.6	286.7	530	382.5	129.8	83
186	325	191.7	150	411.7	71.3
264	82.3	150.8	230	231.7	82.6
110	252	912	436.7	85.7	336.7
185	95.8	375	126.2	145	405

Figure C-7
Stormwater Data and Probability Function for Buffalo East (BG-C1)

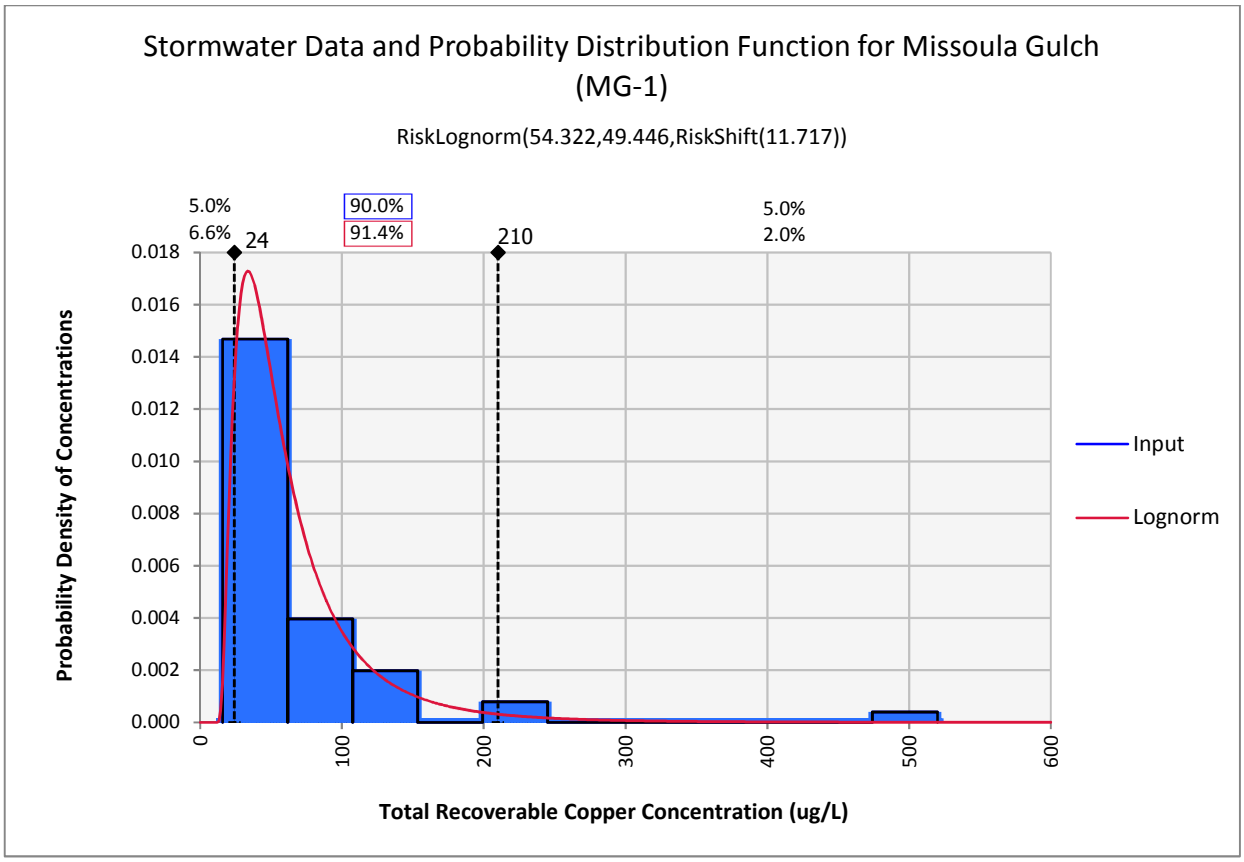


Number	66
Maximum	1550
Minimum	55.8
Mean	311
Median	189

Event Mean Concentration – Raw Data

1550	310	104	540	120	76.4
198	110	112	320	147.3	133.1
500	280	199	400	114	110.5
351	180	250	170	260	262.5
460	62	200	80	79.2	55.8
350	1300	310	120	463.8	88.7
1500	300	400	920	210	77.3
120	100	460	120	95	84.25
94	106	230	1300	350	303.8
220	120	770	215	120.1	127.5
1200	130	75	160	129.5	135

Figure C-8
Stormwater Data and Probability Function for upper SBC-3A

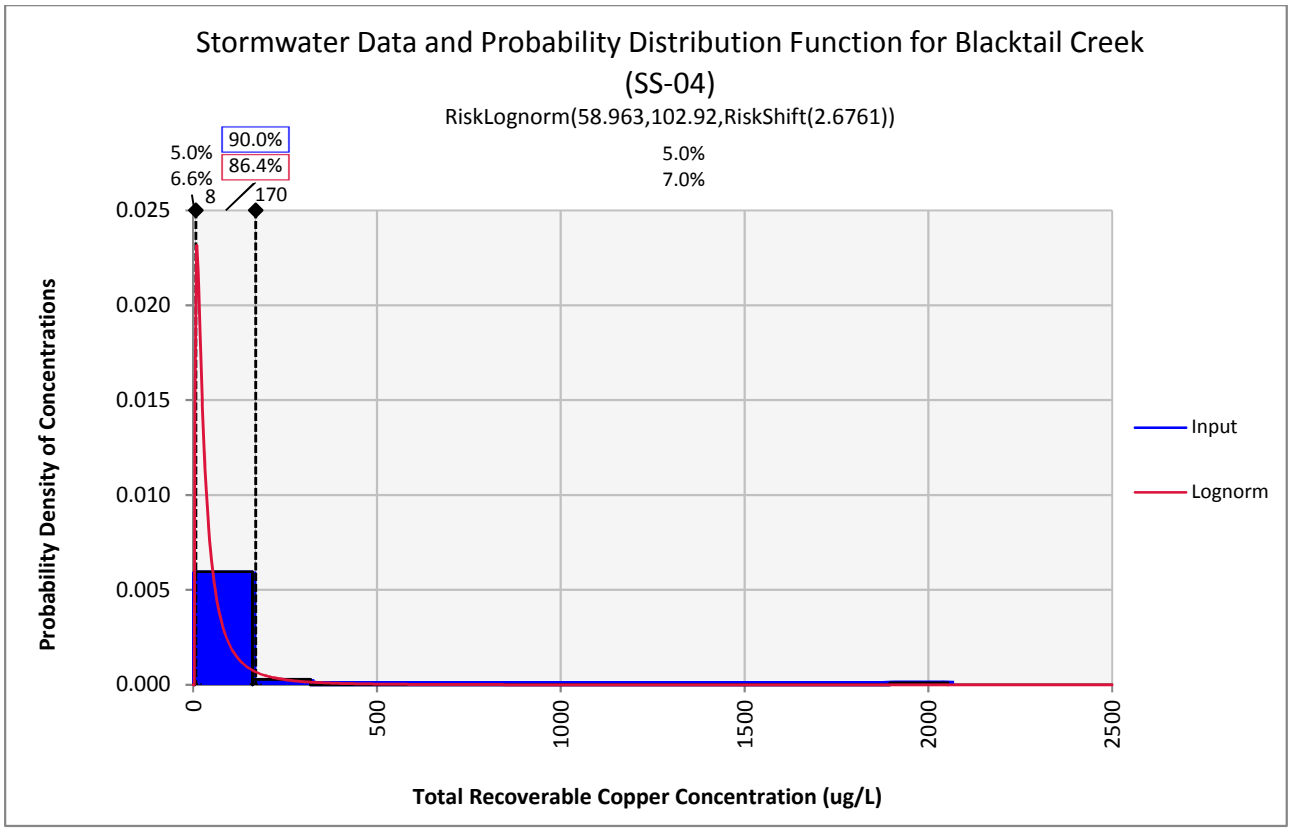


Number	55
Maximum	520
Minimum	15.9
Mean	69
Median	47

Event Mean Concentration – Raw Data

113	24.2	54	45	62
139	21.4	41	59	63
210	30	48	92	59
226.7	70	54.7	68	81
42.8	41	49	80	520
37.2	67	44.1	81	36
34.2	47	15.9	110	37
32.5	27	54.2	45	45
47.4	36	76	47	30
36.2	41.2	42	52	120
34.5	36	32	55	120

Figure C-9
Stormwater Data and Probability Function for Missoula Gulch (MG-1)

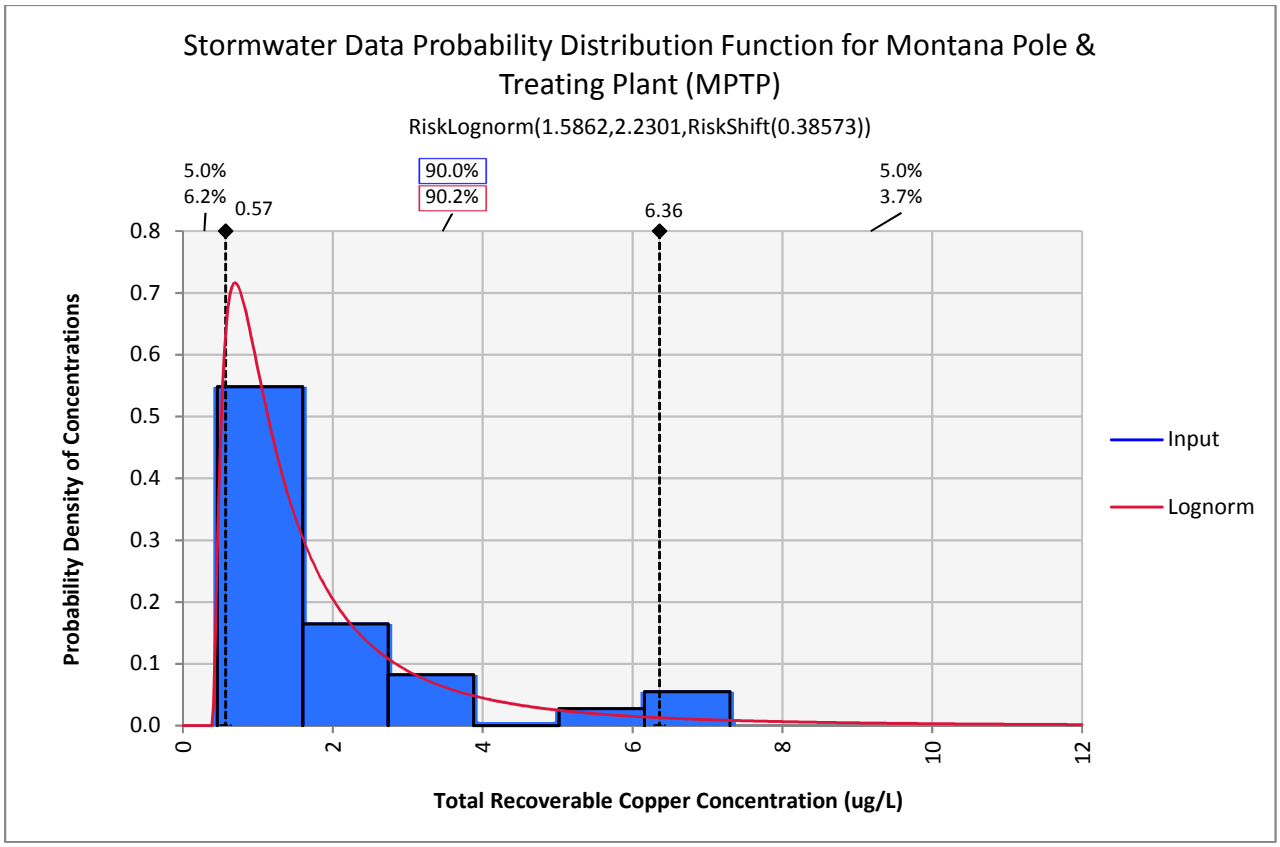


Number	66
Maximum	2053.6
Minimum	3.9
Mean	79.9
Median	27.3

Event Mean Concentration – Raw Data

31.6	62.8	27	6.1	100	26.8
41.1	2053.6	21.5	140	43.5	13.1
126	18.8	20	68	30	64.9
22.3	18.2	19.7	16	27.5	29.5
16.4	98	75.5	27	46	170
130	16	27.5	39.5	109.8	27
3.9	31.1	62	24.8	24.5	266.7
18.5	13.8	13.4	36.3	99.5	80.5
20.5	8.8	4.9	22	13	58
7.6	300	38.6	18	47.8	48.5
8.3	21.8	11.1	17	25.8	118.5

Figure C-10
Stormwater Data and Probability Function for Blacktail Creek (SS-04)

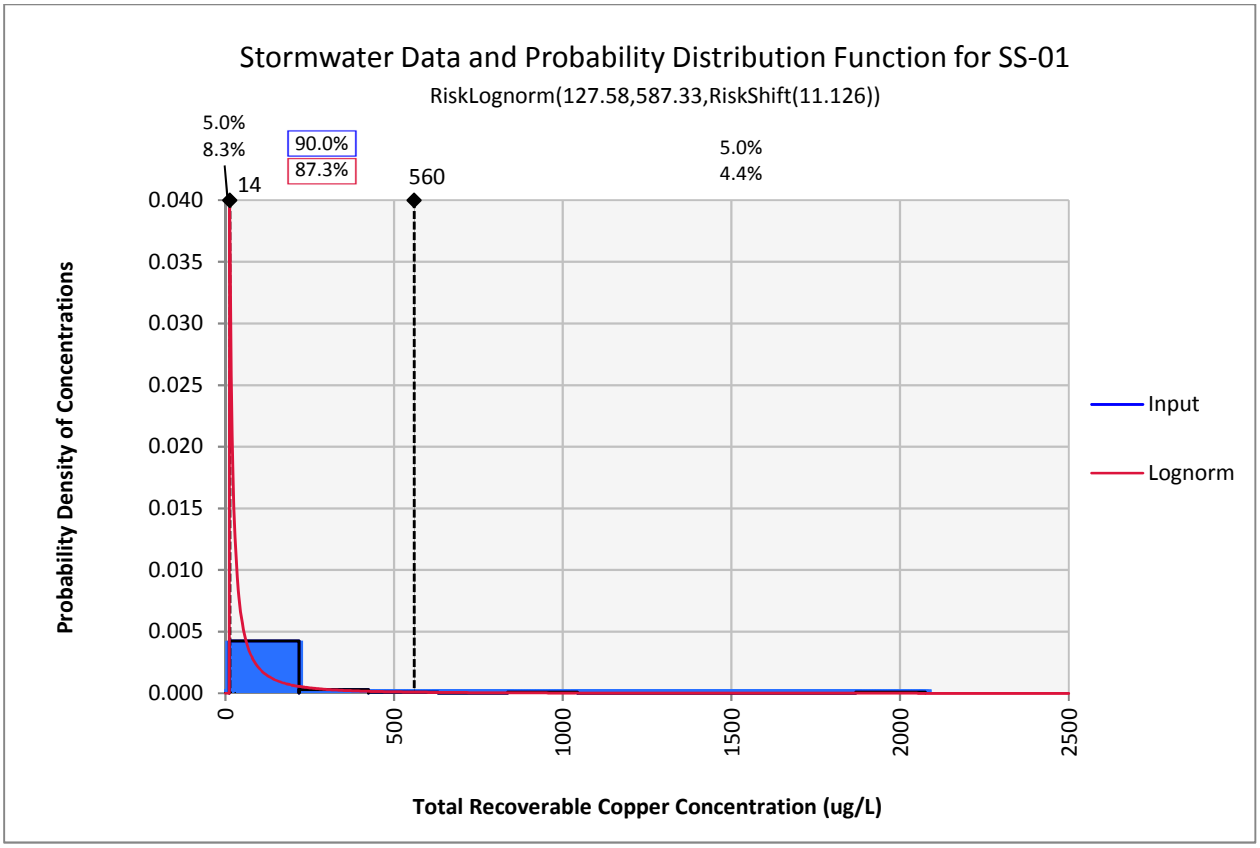


Number	32
Maximum	7.3
Minimum	0.46
Mean	1.91
Median	1.4

Event Mean Concentration – Raw Data

3.3	1.3	0.9	2.5
2.9	0.6	0.7	0.7
1.5	1.2	1.5	0.6
5.7	1.3	1.4	3.1
2.2	0.5	0.7	1.7
1.6	0.8	1.8	6.4
2.4	1.4	0.7	1.2
2.2	0.8	0.7	7.3

Figure C-11
Stormwater Data and Probability Function for Montana Pole & Treating Plant (MPTP)



Number	49
Maximum	2075
Minimum	11.5
Mean	135
Median	36

Event Mean Concentration – Raw Data

23.8	17.3	123.5	17.8	334
88	27	17.9	180	115.3
268	53.5	36.3	47.5	55.5
17.4	110.8	41	54	560
11.5	19	11.5	15.8	143.3
169.3	119	14.8	23.8	70
130	44	13.5	28.3	30
19.8	24	25.3	22.5	16
76.8	19.3	19	21	304.5
2075	18	890	35.8	

Figure C-12
Stormwater Data and Probability Function for SS-01

APPENDIX C2

Data Set Correlations

Data Set Correlations

Data collected and utilized as part of this technical impracticability (TI) report were statistically analyzed to determine what correlation, if any, exists between stormwater chemistry and individual sub-basins within the Butte Priority Soils Operable Unit (BPSOU). If it is not determined whether a correlation exists, it is therefore assumed model inputs are probabilistically independent. However, quantities in the real world are generally correlated to an extent, either positively or negatively, and therefore to ensure the data inputs are managed correctly, the correlations between sub-basins were calculated and added to the @Risk® model.

To carry out the analysis, data including the sample group (location), sample dates and times, sample types (field grab (FG), automatic sampler (AS) or in-stream sampler (IS)), as well as the results of total recoverable copper concentrations, were initially copied and transferred into Microsoft Excel® spreadsheets for the following sample outfall locations:

- Texas Avenue (TX-1)
- Warren Avenue (WA-1)
- Locust Street[1]
- Harrison Street (Harrison 1)
- Harrison Street (Harrison 2)
- Driggs Street
- Phillips Street
- California Avenue
- Montana Avenue
- Anaconda Road (AR-1)
- Buffalo Gulch (BG-01)
- Buffalo Gulch East (BG-C1)
- Upper Silver Bow Creek-3A (upper SBC – 3A)
- Missoula Gulch (MG-1)
- Montana Pole and Treating Plant (MPTP)
- Blacktail Creek (SS-04)
- Delaware Street

Data for instream locations were analyzed for the following:

- SS-01 (wet weather)
- SS-04 (wet weather)

All data collected from the individual outfalls listed were utilized (FG, AS and IS), however only the first four IS samples from instream sample stations (SS-04 and SS-01) were used as part of the analysis.

Paired lists of measured runoff concentration data were then created by combining two sub-basin sampling sites. Data were only used if both sites recorded an event on the same date and within (+ or –) 30 minutes of each other

[1] It is important to note, due to their close proximity to the Locust Street outfall, as well as the comparable size of each catchment, data from Locust has been used to also represent Harrison Street (1 and 2), Driggs Street, Phillips Street, California Avenue and Delaware Street outfalls.

(taking into account possible lag times). For example, a paired list of analytical results (shown in µg/L) for upper SBC-3A and MG-1 is shown in Table C-1.

DATE	SBC-3A	MG-1
7/27/09	220	70
6/15/10	1300	45
6/16/10	300	67
7/3/10	100	41
6/7/11	230	36
6/8/11	770	37
6/9/11	75	36
8/1/13	464	210
9/13/13	350	227
9/17/13	120	43
9/24/13	130	37
6/20/14	304	47
6/25/14	135	36

Table C-1: Pairing of Concentration Data from Individual Sub-basins SBC-3A and MG-1

To ensure the correlation values were compatible with the @RISK® program, a Spearman Rank correlation coefficient (R-value), which is different to the standard Pearson correlation coefficient, was calculated. Pearson correlations assume linear distributions, however as a large quantity of distributions are typically non-linear, the Spearman is more appropriate. This was calculated in Microsoft Excel® using the Correl() function using ranked data. This entails ranking copper concentrations from each output from the highest to lowest concentration (1 to N). As an example, using the paired list of analytical results (shown in µg/L) above, the list for SBC-3A and MG-01 is shown in Table C-2.

DATE	SBC-3A	rank	MG-1	rank
7/27/09	220	8	70	3
6/15/10	1300	1	45	6
6/16/10	300	6	67	4
7/3/10	100	12	41	8
6/7/11	230	7	36	12
6/8/11	770	2	37	10
6/9/11	75	13	36	12
8/1/13	464	3	210	2
9/13/13	350	4	227	1
9/17/13	120	11	43	7
9/24/13	130	10	37	9
6/20/14	304	5	47	5
6/25/14	135	9	36	11

Table C-2: Ranking Data at Each Outlet from Highest to Lowest Copper Concentration

The Correl() function in Microsoft Excel® is then used to calculate a Pearson correlation coefficient using the ranked values. This equates to a Spearman Rank coefficient for the actual concentration data, which is what is needed in @RISK®.

=CORREL(F4:F16,H4:H16)

D	E	F	G	H	I	J
SAMPLE_DATE	**SBC-3A**	**rank**	**MG-1**	**rank**		
7/27/2009	220 µg/L	8	70 µg/L	3		
6/15/2010	1300 µg/L	1	45 µg/L	6		
6/16/2010	300 µg/L	6	67 µg/L	4		
7/3/2010	100 µg/L	12	41 µg/L	8		
6/7/2011	230 µg/L	7	36 µg/L	12		
6/8/2011	770 µg/L	2	37 µg/L	10		
6/9/2011	75 µg/L	13	36 µg/L	12		
8/1/2013	464 µg/L	3	210 µg/L	2		
9/13/2013	350 µg/L	4	227 µg/L	1		
9/17/2013	120 µg/L	11	43 µg/L	7		
9/24/2013	130 µg/L	10	37 µg/L	9		
06/20/14	304 µg/L	5	47 µg/L	5		
06/25/14	135 µg/L	9	36 µg/L	11		
	r value =	**0.45925**				
	(equates to Spearman Rank coefficient for concentration values)					

Figure C-1: Calculating the R-Value with the Use of the Correl() Function in Microsoft Excel®

Once all of the R-values were calculated, a worksheet using the @Risk® 'define correlations' function was created. The correlation coefficients were then manually entered into the table (see Table C-3, below). Subsequently, the correlations were linked to the @Risk® model, through the use of the RiskCorrmat function, by incorporating it into the distribution function equation, as described below.

The generated probability distribution function (PDF) for the Missoula Gulch (MG-1) sub-basin included:

=RiskLognorm(54.322,49.446,RiskShift(11.717)

The RiskCorrmat function was added to the distribution function equation, as described below:

=RiskLognorm(54.322,49.446,RiskShift(11.717),RiskCorrmat(CorrelationMatrix,14))

The RiskCorrmat function ties the calculated correlation coefficients to the relevant distribution function formula of each sub-basin. This assists in determining the most accurate simulation output(s) for each of the individual technical elements for surface water quality within the BPSOU. Once data were input into the correlation matrix, the @RISK® model was ready to run, with the model automatically performing Monte Carlo sampling in accordance with the prescribed correlations. For example, for high correlation coefficients (close to 1.0), when one probability distribution function is sampled at the upper end of the distribution, the sample from the correlated

distribution will also be sampled at the upper end. Note for negative coefficients, it works in the opposite way (a high value from one distribution results in a low value from the correlated distribution).

Where results indicated a negative correlation coefficient existed, tests of statistical significance were undertaken using StatTools, a Microsoft Excel® statistics add-in. In the event the P-value for the data set was less than the prescribed alpha (α) level of 0.05, the correlation was considered statistically significant. However, if the P-value was greater than 0.05 the correlation was considered statistically insignificant, or may have resulted due to a lack of available data presented. Examples of outputs from the program are shown in Figures C-2 and C-3 below. If, after running the model negative values were considered insignificant, the R-values were revised to be 0.

@RISK® Correlations	Texas Ave	Warren Ave	Locust St	Harrison 1	Harrison 2	Driggs St	Philips St	California Ave	Montana Ave	Anaconda Rd	Buffalo A (BG-01)	Buffalo Gulch East (BG-C)	SBC - 3A	Missoula Gulch (MG-1)	MPTP	Blacktail (SS-04)	Delaware St
Texas Ave	1																
Warren Ave	0.59	1															
Locust St	0.40	0.80	1														
Harrison 1	0.40	0.80	1	1													
Harrison 2	0.40	0.80	1	1	1												
Driggs St	0.40	0.80	1	1	1	1											
Philips St	0.40	0.80	1	1	1	1	1										
California Ave	0.40	0.80	1	1	1	1	1	1									
Montana Ave	1	1	0.80	0.80	0.80	0.80	0.80	0.80	1								
Anaconda Rd	0.80	0.59	0	0	0	0	0	0	0	1							
Buffalo A (BG-01)	0.74	0.44	0	0	0	0	0	0	1	0.71	1						
Buffalo Gulch East (BG-C1)	0.61	0.60	0	0	0	0	0	0	1	0.64	0.77	1					
SBC - 3A	0.58	0.56	0	0	0	0	0	0	0	0.51	0.52	0.42	1				
Missoula Gulch (MG-1)	0.40	0.22	0	0	0	0	0	0	1	0.50	0	1	0.46	1			
MPTP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Blacktail Ck (SS-04)	0.28	0.38	0	0	0	0	0	0	0	0	0.32	0.45	0.25	-0.92	0	1	
Delaware St	0.40	0.80	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1

Table C-3: Correlations between Drainage Areas within the BPSOU

Regression Statistics	
Multiple R	0.91652
R Square	0.84
Adjusted R Square	0.8
Standard Error	0.73030
Observations	6

Alpha α = 0.05
P-value = 0.0101
0.0101 < 0.05
SIGNIFICANT

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	11.2	11.2	21	0.0102
Residual	4	2.13333	0.53333		
Total	5	13.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	6.13333	0.67987	9.02134	0.00084	4.24571	8.02095	4.24571	8.02095
X Variable 1	-0.8	0.17457	-4.58258	0.0102	-1.28470	-0.31530	-1.28470	-0.31530

Figure C-2: An Example of a Statistically Significant Correlation Coefficient between Sub-Basins Output at Missoula Gulch (MG-1) and Blacktail Creek (SS-04)

Regression Statistics	
Multiple R	0.01678
R Square	0.00028
Adjusted R Square	-0.12468
Standard Error	3.63267
Observations	10

Alpha = 0.05
P-value = 0.96331
0.96331 > 0.05
NOT SIGNIFICANT

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.02973	0.02973	0.002253	0.96331
Residual	8	105.57027	13.19628		
Total	9	105.6			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	5.68292	2.72080	2.08869	0.07016	-0.59127	11.95712	-0.59127	11.95712
X variable 2	0.01858	0.39149	0.04747	0.96331	-0.88420	0.92137	-0.88420	0.92137

Figure C-3: An Example of a Non-Significant Correlation Coefficient between Sub-Basins Buffalo Gulch (BG-01) and Missoula Gulch (MG-1)

APPENDIX D1

Revised Technical Memo 1:
Butte Priority Soils Operable Unit Existing Conditions HydroCAD Model

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January 15, 2015

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RE: Revised Technical Memo 1: Butte Priority Soils Operable Unit (BPSOU) Existing Conditions HydroCAD Model

Ladies and Gentlemen:

Atlantic Richfield Company is submitting a *Revised Technical Memorandum 1: BPSOU Updates and Data Correlation to the September 2014 BPSOU Existing Conditions HydroCAD Model* for your review, approval, and use in the surface water technical impracticability evaluation effectiveness modeling. **Please note that this version replaces the October 6, 2014 version of Technical Memo 1.** We are providing the initial version of this memorandum on the electronic file transfer protocol (ftp) site "ShareFile." In addition, hard copies of the memorandum with electronic appendices on a CD will be provided to the EPA and DEQ.

It is anticipated that this memo and model would not be distributed outside of the working group until the model has been sufficiently vetted by the review team. Once this model is approved by the appropriate stakeholders, it is proposed that Butte-Silver Bow become the keeper of the updated model and a letter distributed to Group I and Group II indicating that the model may be obtained from Butte-Silver Bow.

If you have questions or concerns, please do not hesitate to call me at (406) 723-1826.

Sincerely,

Loren Burmeister
Operations Project Manager

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Memo

To: Loren Burmeister (Atlantic Richfield)

From: Chad Bailey (Pioneer)

CC: George Austiguy, Mike Borduin (Pioneer)

Date: January 15, 2015

Re: Revised Technical Memo 1: Updated BPSOU Existing Conditions HydroCAD Model

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Background

At the request of EPA, the HydroCAD model provided to the Agencies on October 6, 2014 has been updated based on current National Resources Conservation Service (NRCS) hydrologic soil groups (HSGs) (NRCS, 2013) and Curve Numbers (CNs) provided by CDM-Smith. This *Revised Technical Memo 1: Butte Priority Soils Operable Unit (BPSOU) Existing Conditions HydroCAD Model* (Revised Technical Memo 1) provides modified assumptions, methodology, and an updated BPSOU Existing Conditions HydroCAD Model, therefore replacing the version submitted to the Agencies on October 6, 2014. This updated BPSOU Existing Conditions HydroCAD Model is being provided in support of the ongoing storm water technical impracticability (TI) evaluation efforts and potentially to support design of future storm water improvement projects.

In 2009, under the previous TI effort, CDM-Smith developed a HydroCAD model for the Butte Hill drainages that was based on 2009 site conditions and the NRCS Unit Hydrograph and Curve Number methods (CDM, 2009). Because the 2009 model was based on 2009 site conditions, Pioneer Technical Services, Inc. (Pioneer) was asked to update the 2009 model to reflect current conditions.

Objectives and Overview

The objective of this memorandum is to provide the updated HydroCAD model for purposes of performing a TI evaluation. This updated model, the September 2014 BPSOU Existing Conditions storm water rainfall-runoff HydroCAD Model (September 2014 Existing Condition Model) represents the current Butte-Silver Bow Sanitary Storm water system plus two future construction projects. This memorandum documents the steps taken to construct the September 2014 Existing Condition Model, including updating the 2010 BPSOU HydroCAD Model (TREY NOAA type I Sep2009-adjusted, updated 1/21/2011) to the May 2013 Model Configuration (Step 1); providing the rationale for a comparison and comparing the May 2013 Existing Conditions model to a selected correlation storm event (Step 2); and summarizing model updates to future conditions with the September 2014 Existing Conditions Model (Step 3).

The HydroCAD simulations incorporated multiple weather station records including rainfall data from the Butte-Silver Bow (BSB) Shop (hourly data), the Missoula Gulch CB-1 site (hourly data), and the Kelley Mine (5 minute data). Using the storm water modeling system HydroCAD, the closest match between measured and modeled peak flow was obtained by applying the 5-minute Kelley Mine weather station rainfall data. Using these data, the measured and modeled initial peak flows, times, and magnitudes match reasonably well, however the secondary peaks were overestimated. Given the complexity of the physical processes and the available data, the September 2014 Existing Condition Model (Attachment C) provides a reasonable representation of BPSOU rainfall-runoff events.

By updating the HydroCAD model from the 2009 HSGs (CDM, 2009) to 2013 NRCS HSGs (NRCS, 2013), the HydroCAD model more closely estimates runoff volumes in three out of four main drainage basins from the September 17, 2013 storm. For Buffalo Gulch, East Buffalo Gulch, and Anaconda, the modifications to the updated CN values increased the estimated average modeled runoff volumes by 23%, while the modeled runoff volume for Texas Avenue decreased by approximately 20%.

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Step 1: Updating CDM 2010 HydroCAD Model to May 2013 Conditions

Step 1 outlines the steps taken to update the CDM 2010 BPSOU HydroCAD Model to represent the Butte-Silver Bow (BSB) sanitary storm water system as it currently exists at the time of this memorandum. Because the last documented improvement to the system was completed in May of 2013, Step 1 refers to the May model as the May 2013 Conditions Model.

To prepare to update the 2010 BPSOU HydroCAD Model, as-built and/or design drawings for all known upgrades to the sanitary storm system prior to September of 2014 were requested from Water and Environmental Technologies (WET). Table 1 lists these upgrades and as-built drawings or design plans for the projects are included in Attachment A.

Pre-2009 Updates
As mentioned previously, the 2010 BPSOU HydroCAD Model did not include the 2007 drainage area improvements to the western portion of the lower railroad yard described in *Design Report for Railroad Yard Stormwater Improvements – 2007* (HKM, 2007). The additional runoff areas from the lower railroad yard reporting to Kaw Avenue are now part of the May 2013 Conditions Model. Table 4 lists the details of the additional drainage area and culvert to the railroad yard region.

CN Update
The NRCS published an update (Version 7) to the soil survey for "Silver Bow County Area and Parts of Beaverhead and Jefferson Counties, Montana" on December 19, 2013 (NRCS, 2013), which includes revised HSGs. CDM-Smith used the revised HSGs to develop new CN values for the HydroCAD model. A comparison of the CN values utilized in the 2010 BPSOU HydroCAD model and the model included with this Revised Technical Memo 1 are provided in Table 5. In general, using the updated HSGs (NRCS, 2013) increases the CN values.

Results
Table 1 summarizes the recent storm water infrastructure projects and resultant changes to the existing condition HydroCAD model. Tables 2 through 4 detail the model changes resulting from the recent storm water infrastructure projects. Table 5 summarizes the model CN values from the updated NRCS soil survey release (NRCS, 2013). Attachment B contains the HydroCAD diagrams of the May 2013 Conditions Model.

Step 2: Correlation of May 2013 Conditions Model to Storm Event Data

The purpose of correlating the model to a storm event is to evaluate how closely the May 2013 Conditions Model could simulate field data collected from an actual storm event. This effort was not used as a model calibration, per se, but rather as a check to determine how well the model reproduces storm events with measured precipitation data (Table 1).

Correlation vs. Calibration
To calibrate the model would require further updates to the time of concentration values. Because updating the time of concentration values to represent this storm would be a significant effort, and the updates would not be applicable to the five-year synthetic design storm that would be used during the TI evaluation, changes to the time of concentration were not conducted as part of this effort.

Assumptions
The primary assumptions used to correlate the May 2013 Conditions Model (or any storm water model) are as follows:

1. The correlation storm rainfall was distributed evenly over the entire drainage basin for the storm duration.
2. For the selected correlation storm rainfall event, the two storms occurring within five days of the correlation storm event resulted in wet ground, and an antecedent moisture condition 3 (AMC3) was used in the modeling.

Methods
The correlation effort involved selecting a field measured, rainfall-runoff event, which was then used to compare measured storm event runoff data to modeled runoff data simulated in HydroCAD. Selecting a storm event for

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correlation involves developing storm selection criteria (to provide that was near consistent with the rainfall-runoff model limiting assumptions) and evaluating available rainfall and stage data. The storm selection criteria utilized in Revised Technical Memo 1 are as follows, where a storm must have:

1. A minimum storm precipitation depth of 0.5 inches.
2. A storm duration of approximately 24 hours.
3. Measured discharge from all the main BPSOU drainage areas (indicating rainfall occurred over all the main drainage areas, which is a limiting assumption of the HydroCAD model).

Data

Rainfall data is collected at several weather stations around Butte, including at the BSB Shop (hourly data), the Missoula Gulch CB-1 site (hourly data), and the Kelley Mine (5 minute data). Corresponding stage and flow data are collected at numerous locations within the BPSOU monitoring network as part of the BPSOU diagnostic monitoring, and are recorded every 5 minutes.

The correlation storm was selected from a narrow data set from June to December of 2013. The rationale behind this narrow data set is to use both validated data and data collected after the last known update to the sanitary storm water system. At the time of this memo, the available stage and flow data for 2014 were preliminary (i.e., had not been through a quality assessment process). Furthermore, as mentioned previously in Step 1, the last completed update activity to the May 2013 Conditions Model was the Buffalo Gulch Tunnel Lining, completed in May of 2013. Consequently, only storms after May 2013 and before 2014 were considered as correlation candidates. During this period, six candidate rainfall events occurred; Table 6 lists the date of each event, the total rainfall (using one-hour rainfall data), and the duration of each storm.

Selection of Correlation Storm Event

Of the six candidate rainfall events identified in Table 5, the rainfall event closest to the criteria identified above occurred on September 17, 2013. As shown in Table 5, this event had a minimum storm precipitation depth of 0.5 inches (depth of 0.62 inches), a storm duration of approximately 24 hours (duration of 28 hours), and a measured discharge from all the main BPSOU drainages. This storm is recommended as the correlation storm event.

Selection of Most Sensitive Precipitation Data

The correlation effort used cumulative precipitation depths from the BSB Shop, Missoula Gulch CB-1, and Kelley Mine weather stations. Of the three weather stations, precipitation data from the BSB Shop and the Kelley Mine demonstrated the most sensitivity to rainfall intensity (Figure 1) and, therefore were selected for the correlation simulations.

Antecedent Moisture Conditions

Antecedent moisture conditions refers to the moisture content of the drainage basin soils prior to a storm event, and can be rated as antecedent moisture condition (AMC) 1 (dry, but above the wilting point), 2 (normal), or 3 (saturated soil). Within 5 days of the September 17, 2013 storm event, 2 previous storms occurred. The rainfall gages at BSB Shop (0.12 inches), CB-1 (0.68 inches), and Kelley Mine (0.61 inches) show 5 hours of rainfall on September 13, 2013, and the Kelley Mine gage shows 0.01 inches on September 15, 2013. It has been assumed in this Revised Technical Memo 1 that these previous storms made the ground wet enough to warrant an antecedent moisture condition (AMC)3 value (i.e., "*when heavy rainfall or light rainfall with low temps have occurred producing high runoff potential*" [Wanielista et. al., 1997]).

Using AMC3 conditions, Figures 2 through 5 show a comparison of field measured data versus modeled simulated output (modeled data) with the four major drainage basins within BPSOU that discharge to the Metro Storm Drain (MSD) or Silver Bow Creek (SBC). These four drainage basins include the Buffalo Gulch outfall (BG-01), the East Buffalo Gulch outfall (BG-CH-C1), the Anaconda Road outfall (AR-MH-1), and the Texas Avenue outfall (TX-HD-1).

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Correlation of September 17, 2013, Storm Event

Based on the September 17, 2013, storm event, a correlation was performed between measured and modeled flow on five drainages using rainfall from the Kelley Mine and BSB Shop weather stations. Meaningful comparisons to measured and modeled data include a comparison of sequencing (i.e., the order in which outfalls reach peak flow) and lag times (i.e., the time between peak flows for measured and modeled data). When using rainfall data from the Kelley Mine and BSB Shop weather station, the modelled time-to-peak flow is on average longer than the measured time-to-peak flow by approximately 7 minutes and 29 minutes, respectively (Table 7). The information on Figure 1 also suggests that simulations using the 5-minute Kelley Mine weather station data produce magnitudes and intensity patterns that more closely follow the measured data than the BSB Shop weather station data. These results suggest that using 5-minute Kelley Mine weather station data produces modeled results that most closely match measured runoff data (Table 7).

A comparison of measured and modeled cumulative storm volumes at four drainages is provided in Table 7 as the percent (%) volume difference. The % volume difference was -10.6% at Buffalo Gulch (underestimate by the model), 28.7% at East Buffalo Gulch (overestimated by the model), 9.8% at Anaconda, and -78% at Texas Avenue. To estimate measured cumulative storm volumes, base flows from Buffalo Gulch and East Buffalo Gulch were subtracted from measured storm flow data to compare storm volumes without a base flow component. This comparison demonstrates a previously discussed limiting assumption of the model, where rainfall received at a weather station is applied in uniformly in the model to the entire drainage basin, whereas in reality storms arrive at each drainage at slightly different times and intensities. For example, the large difference in volume estimates for Texas Avenue (-78%, Table 7) may be due to the Kelley Mine rain gage being located at a higher elevation on the Butte hill; whereas the Texas Avenue basin is located near the bottom of the Butte hill and in an area that may have experienced much different rainfall. Discrepancies in these magnitudes and timing could be due to many reasons, including the following:

- Assumption that rainfall is distributed evenly over the entire drainage basin;
- Measured rainfall may not capture the highest intensity or depth areas;
- Time of concentration estimates not correlated to simulated storm;
- Potential measurement error at monitoring locations;
- Changes in stage-discharge relationships due to accumulated or scoured sediment; and
- Differences between theoretical Curve Number (CN) values to represent variable surfaces on the landscape and actual conditions for large areas may be different.

In comparison to the October 6, 2014 version of Technical Memo 1, the modifications to the updated CN values (NRCS, 2013) improved the agreement between the measured and modeled runoff volumes. Using Kelley Mine rainfall data, the estimated modeled runoff volumes improved the agreement with measured runoff volumes for Anaconda by 30%, East Buffalo Gulch by 15%, and Texas Avenue by 35%, while decreasing agreement at Buffalo Gulch by approximately 4%. In general, the runoff volumes for Buffalo, East Buffalo, and Anaconda drainages increased approximately 23%, while the runoff volume for Texas Avenue decreased approximately 20%.

Step 3: Updating Model to September 2014 Conditions

Using the correlation comparison and as-built or design drawings from construction activities occurring in the fall of 2014 (Attachment A), Pioneer completed the September 2014 Existing Condition Model (Attachment C). As of September 2014, two construction projects (Kaw Avenue Re-route and Continental Roadside Channel) were close to completion, and are finished or nearly finished as of January 2015. The May 2013 Existing Condition model has been updated with as-built or design drawings (Attachment A) from these two projects to construct the September 2014 Existing Condition Model (Attachment C). The Kaw Avenue Re-route (Attachment A) was completed in the fall of 2014, and details of the model modifications for the pipe realignment and replacement from Front Street to the ditch between Kaw Avenue and Holland Street are provided on Table 8.

Since the October 6, 2014 version of Technical Memo 1, it has been determined that the Outlet Structure on Sheet P-3 (Attachment A) was modified to be 0.14 feet higher than the original plan set (Attachment A). This change is reflected in the revised September 2014 Existing Condition Model (Attachment C) and the details provided on Table 8 have been modified appropriately (i.e., Node BG-R-24c invert out and Node BG-R-25 invert in). Similarly, the Continental Roadside

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Channel was mostly completed in the fall of 2014 (Attachment A), with minor revegetation work to be completed in 2015. Table 9 provides details of the model revisions for the Continental Roadside Channel (note that earlier versions of the BPSOU HydroCAD model did not include any drainage area upgradient from the MSD-TX node).

Table 10 summarizes peak runoff flow changes in the model output from the updates described above compared to the 2010 BPSOU HydroCAD Model. Attachment B shows the diagrams of the May 2013 model and September 2014 Existing Condition HydroCAD models.

Conclusions

The May 2013 Model Configuration updated the adjusted 2010 BPSOU HydroCAD Model for known changes to the storm water conveyance system through May of 2013 (May 2013 Existing Condition Model) and was correlated to the September 17, 2013 storm event. Once correlated, the May 2013 Model was further updated to incorporate two projects scheduled for construction in the fall of 2014. This updated model is referred to as the September 2014 Existing Condition model and is provided in Attachment C.

In comparing measured and modeled time-to-peak flows, modeled time-to-peak flows using BSB shop rainfall data were an average of 29 minute longer, while modeled time-to-peak flows using 5-minute Kelly Mine rainfall data were an average of 7 minutes longer (Table 7). Modeled peak flow magnitudes from HydroCAD simulations using 5-minute Kelley Mine weather station rainfall data more closely match field measured peak flow data than using BSB Shop rainfall data (Figures 2 through 5). In general, the simulated magnitude of the initial peak matches reasonably well with the measured data, but typically overestimates the secondary peaks.

Lag times in the model using 5-minute Kelley Mine weather station rainfall data are consistent with measured lag times (response time of each basin relative to the other basins in the model). Modeled peak flow estimates vary in magnitude when compared with the measured peak flows, and this variability is interpreted to be due to the complexity of actual storm events and the assumptions inherent in rainfall-runoff models as discussed above.

Given the complexity of the physical processes and the available data, the revised September 2014 Existing Condition Model provides a reasonable representation of BPSOU rainfall-runoff events. The modifications to the HydroCAD model using the updated CN values (NRCS, 2013) with Kelley Mine rainfall data further improve agreement with modeled an measured runoff volumes, increased the estimated modeled runoff volumes for Buffalo Gulch, East Buffalo Gulch, and Anaconda by an average of 23% and decreased the modeled runoff volume for Texas Avenue by approximately 20%.

References

CDM, 2009. Draft Butte Stormwater Modeling Report. 2009. Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site. October 1, 2009.

HKM, 2007. Design Report for Railroad Yard Stormwater Improvements. 2007.

NRCS, 2013. Version 7, Silver Bow County Area and Parts of Beaverhead and Jefferson Counties, Montana. December 19, 2013

Wanielista, M, Kersten, R., and Eaglin, R., 1997. Hydrology: Water Quality and Quality Control, 2nd edition. John Wiley & Sons, Inc. 1997

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Figures

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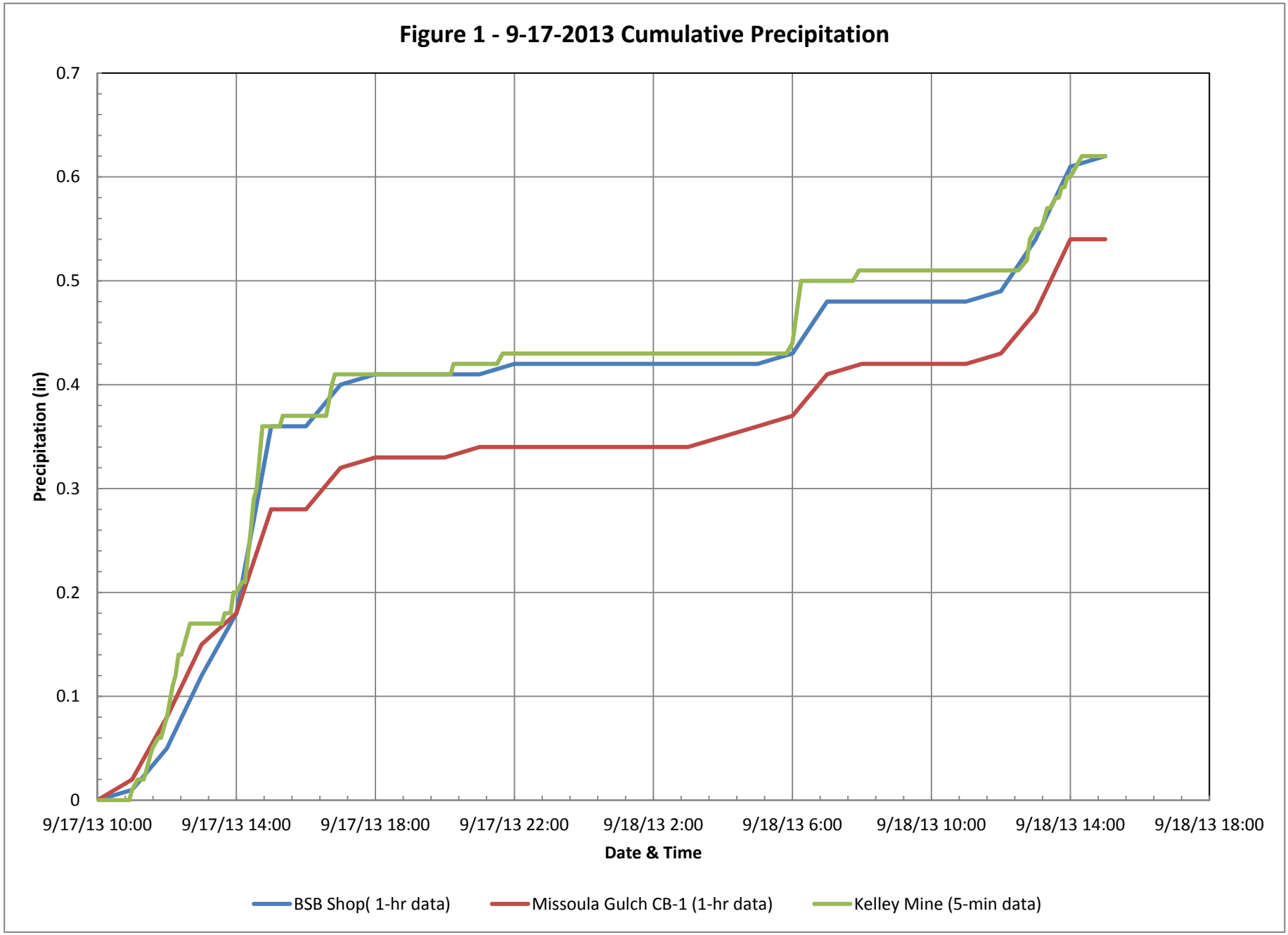

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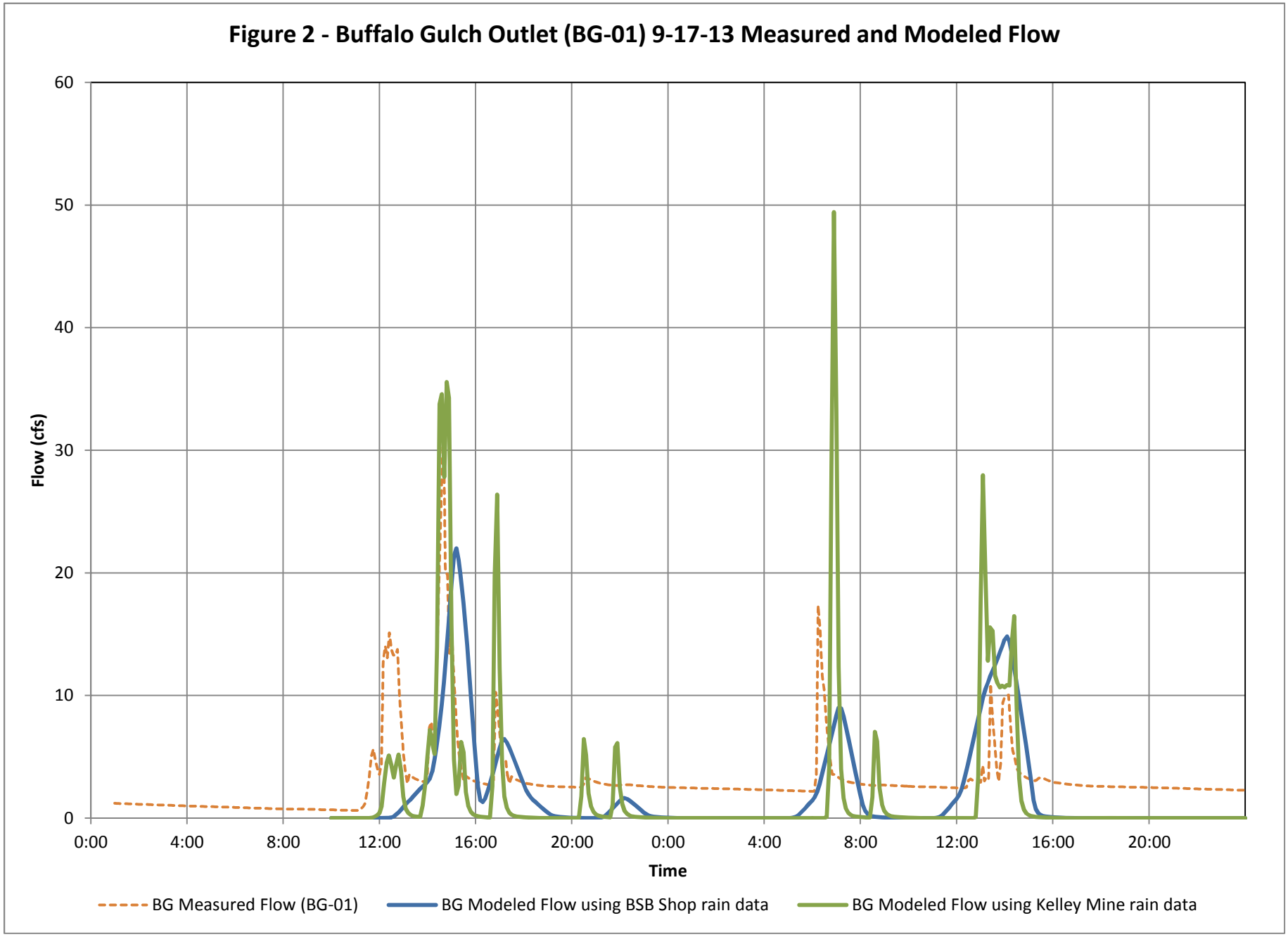

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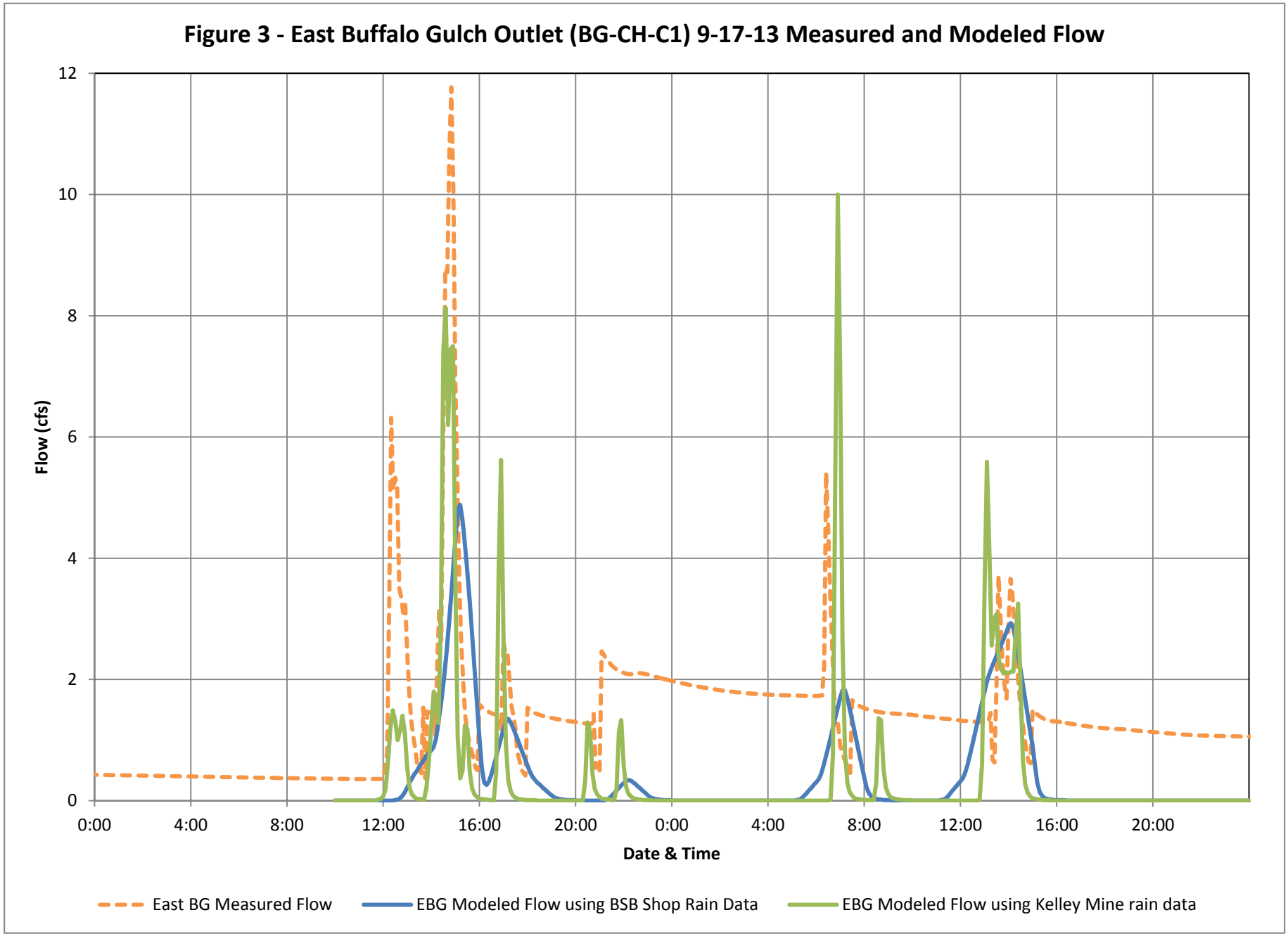
Figure 3 - East Buffalo Gulch Outlet (BG-CH-C1) 9-17-13 Measured and Modeled Flow
Flow (cfs)
12
10
8
6
4
2
0
0:00
4:00
8:00
12:00
16:00
20:00
0:00
4:00
8:00
12:00
16:00
20:00
Date & Time
East BG Measured Flow
EBG Modeled Flow using BSB Shop Rain Data
EBG Modeled Flow using Kelley Mine rain data

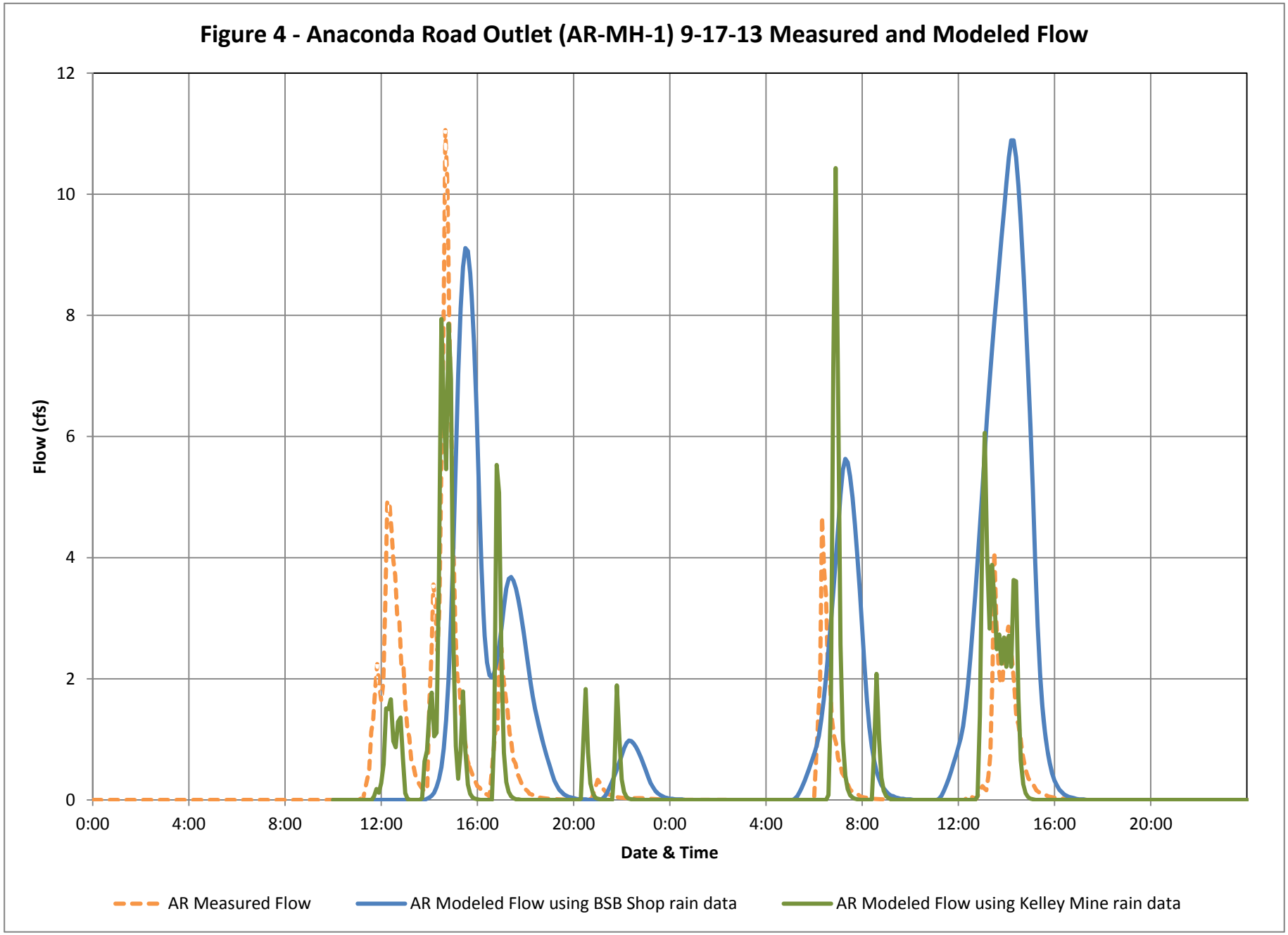
Figure 4 - Anaconda Road Outlet (AR-MH-1) 9-17-13 Measured and Modeled Flow
Flow (cfs)
12
10
8
6
4
2
0
0:00
4:00
8:00
12:00
16:00
20:00
0:00
4:00
8:00
12:00
16:00
20:00
Date & Time
AR Measured Flow
AR Modeled Flow using BSB Shop rain data
AR Modeled Flow using Kelley Mine rain data

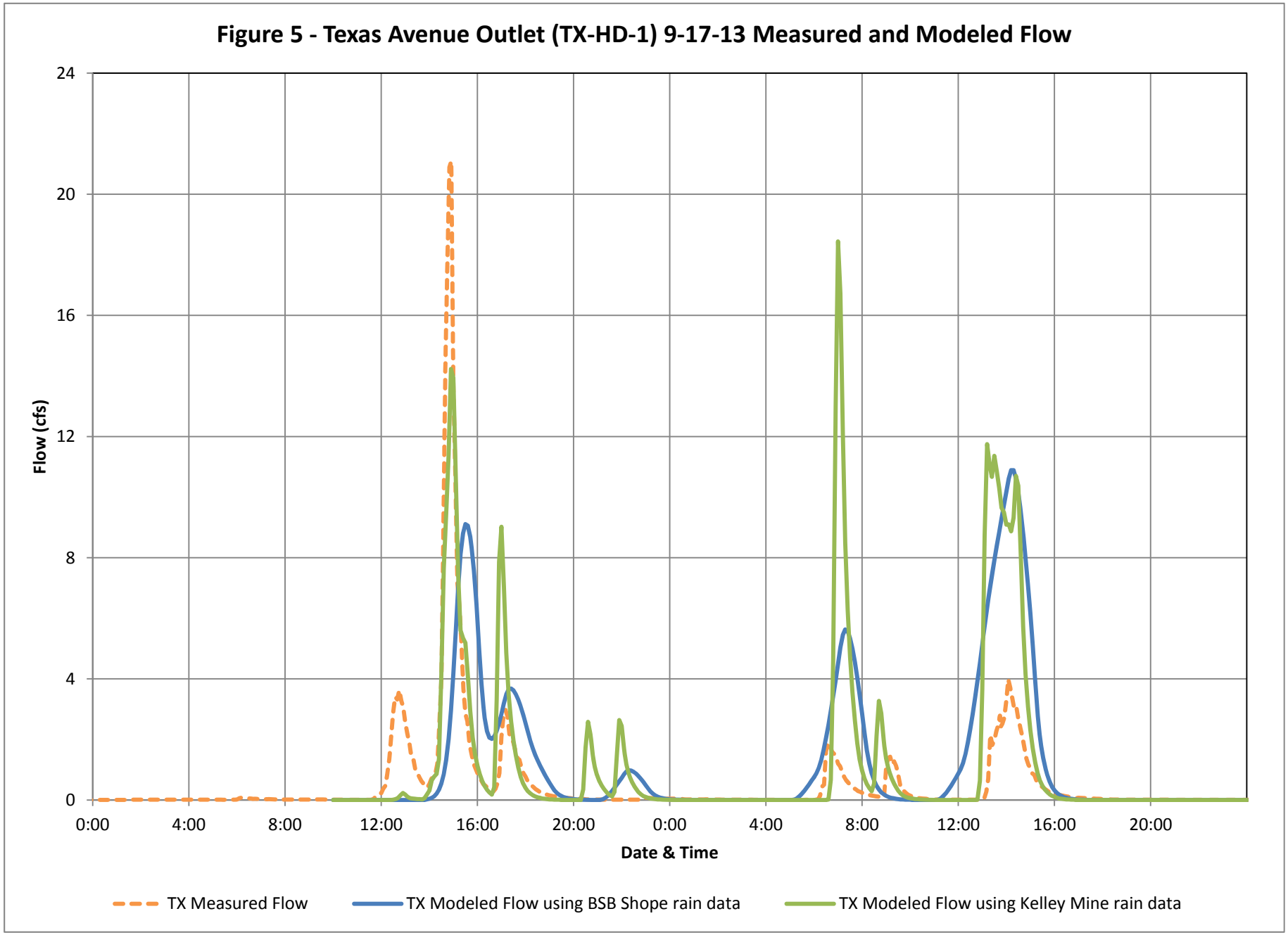
Figure 5 - Texas Avenue Outlet (TX-HD-1) 9-17-13 Measured and Modeled Flow
Flow (cfs)
24
20
16
12
8
4
0
0:00
4:00
8:00
12:00
16:00
20:00
0:00
4:00
8:00
12:00
16:00
20:00
Date & Time
TX Measured Flow
TX Modeled Flow using BSB Shope rain data
TX Modeled Flow using Kelley Mine rain data

Tables

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TABLE 1 - BPSOU STORMWATER PROJECTS 2010 - 2014

Project	Model Change	In BPSOU	Date Constructed	Description	Model Modification Summary
Completed Projects					
Anaconda Road Tunnel Lining	Yes	Yes	1/2011 - 9/2011	Lining of old tunnel from Copper St to Curtis Street	Invert elevations, pipe lengths, pipe diameters and pipe type modified from Curtis Street to Quartz Street for Anaconda Road Trunk Line.
Belle and Buffalo	No	Yes	NA	Small sw project, mostly curb and gutter	Modifications outside of model - reports to Buffalo Gulch Channel to Berkeley Pit.
Buffalo Gulch Tunnel Lining	Yes	Yes	9/2011 - 3/2012; 10/2012 - 5/2013	Lining of Buffalo Gulch tunnel from Woolman St to Webster Garfield Complex (W 1st St.)	Invert elevations, pipe lengths, pipe diameters and pipe type modified from First Street to Woolman Street for Buffalo Gulch S. Dakota Street/Colorado Street Trunk Line.
Dexter Addition Storm Water	No	Yes	NA	Small storm water project near south end of Dexter addition - pipe/ditch work	Small internal change to DA-ID-08. Does not impact the flow path for Tc for the model. No changes to the model.
Hornet Street Storm Water	No	Yes	NA	Storm water pipe/inlets to move a swale off private land – disconnected from system	Internal 12" pipe addition to DA-MG-13. Does not impact the flow path for Tc for the model. No changes made to the model.
Main Street/Daly Street Storm Water Re-Route	No	Yes	NA	Small storm water project near Main-Daly	Approx. 12" pipe and inlets installed at intersection of Daly and Main. Pipes internal to DA-MG-02. Does not impact the flow path for Tc for the model. No change made to the model.
O'Neill Street-Storm Water Pipe Design	No	Yes	NA	Storm water project to alleviate flooding near homes	Small stormwater pipe installed near the border of DA-UBC-01 and DA-UBG-02. Potentially small adjustment to drainage areas. Model left unchanged. UBG discharges to Buffalo Gulch Detention Pond and Berkeley Pit.
Pacific Street	No	Yes	NA	Storm water project near entrance to Foreman Park	Modifications in Upper Buffalo Gulch to a portion of UBG-R-03. Does not impact the flow path for Tc for the model. No change to the model. Elevation discrepancy at outlet of BG-R-03 of 5975 (asbuilt) vs. 6012 (model).
Railroad Yard	Yes	Yes	NA	Western portion of railroad yard drains to Kaw Avenue	Included 3 drainage areas and 48" culvert that route flows to BG
Reynolds	No	No	NA	Small storm project to alleviate local flooding – pipe/inlets	Outside the area reporting to the model. Not included in model
St. Anns Church	No	No	NA	Small sw project to alleviate flooding - pipe/inlet	Outside the area reporting to the model. Not included in model
Projects to be Completed					
Continental Roadside Channel	Yes	Yes	Fall 2014 - Spring 2015	Grading of Continental Roadside Channel north of Continental Drive and south of the Clearwater Channel.	Currently being constructed. Modifications to the drainage areas and channel reporting at the inlet of the MSD will be routed to the MSD.
Kaw Ave. Reroute	Yes	Yes	Fall 2014	Reroute of some piping in the vicinity of Kaw Ave and Front St	Pipe routing modifications to be included in model.

TABLE 2 - ANACONDA ROAD TUNNEL LINING CHANGES

Date 7/22/2014

HydroCAD Model Updates

Updates based on Asbuilt provided by WET on 7/21/2014

				Model Changes		
Node	Comment	Inv Out	Inv In	Length (ft)	Diameter (in)	Material Type
UAR-R-07a	Broke R-07 into two segments at Curtis Street. Trunk Asbuilt STA 0+17 on Curtis to STA 2+48 on Mercury	5623.5	5637.2	236	36	PVC
UAR-R-06	Trunk Asbuilt STA 2+48 to STA 8+37 on Park Street	5637.2	5666.1	589	36	PVC
UAR-R-05	Trunk Asbuilt STA 8+37 to STA 12+40 on Broadway Street	5666.1	5689.8	403	36	PVC
UAR-R-04	Trunk Asbuilt STA 12+57 to STA 15+53 on Granite Street	5689.8	5707.5	296	36	PVC
UAR-R-03	Trunk Asbuilt STA 15+53 to STA 19+92 near Copper Street	5707.5	5736.3	439	36	PVC

TABLE 3 - BUFFALO GULCH TUNNEL LINING CHANGES

Date 7/22/2014

HydroCAD Model Updates

Updates based on Asbuilt provided by WET on 7/21/2014

		Model Changes				
Node	Comment	Inv Out	Inv In	Length (ft)	Diameter (in)	Material Type
BG-R-13	Remaining section of BG-R-13 shortened and updated to 48" SRPE	5444	5467.09	1178	48	SRPE
BG-R-13a	Broke BG-R-13 into 2 segments to reflect partial upgrade to 1st Street. BGT Asbuilt STA 101+15 to STA 106+17.	5467.71	5480.53	502	42	PVC
BG-R-12	BGT Asbuilt STA 106+17 at West Second Street upgradient to 3+19 at W Iron Street	5480.53	5528.17	1263	48	PVC
BG-R-11	BGT Asbuilt STA 3+19 upgradient to STA 13+86 at W Platinum Street	5528.27	5562.9	1067	42	PVC
BG-R-10	BGT Asbuilt STA 13+86 to STA 18+09 at Gold Street (change in pipe size)	5562.93	5578.74	423	42	PVC
BG-R-10a	Broke BG-R-10 into 2 segments. BGT Asbuilt STA 18+09 to STA 22+04 at Porphyry Street	5578.74	5605.03	395	36	PVC
BG-R-09	BGT Asbuilt STA 22+04 to STA 31+05 on Colorado near Mercury Street	5605.03	5659.51	901	42	PVC
BG-R-08	BGT Asbuilt STA 31+05 to STA 36+67 on Park Street	5659.51	5696.18	562	36	PVC
BG-R-07	BGT Asbuilt STA 36+67 to STA 40+21 near Broadway Street	5696.19	5711.02	354	36	PVC
BG-R-05	BGT Asbuilt STA 40+21 to STA 47+12 on Quartz Street (does not include pipe change to 30" from STA 42+70.5 - 42+96)	5713.94	5749.07	691	36	PVC
BG-R-04	BGT Asbuilt STA 47+12 to STA 49+81 on Copper Street	5749.07	5768.2	269	36	PVC
BG-R-03	BGT Asbuilt STA 49+81 to STA 55+82 on Woolman Street (Inlet lowered over 20 feet from previous model)	5768.21	5809.07	601	36	PVC
BG-R-02	BGT Asbuilt STA 55+82 to STA 56+75.19	5809.07			36	PVC
Node	Comment					
DA-BG-20	Tc changed from draining to the east along Front St. to the west. Kaw Reroute investigation discovered no pipe along Main between Front and Holland					

TABLE 4 - RAILROAD YARD ADDITION

Date 8/7/2014
HydroCAD Model Updates
Updates based on HKM Design Report 2007

Model Changes

Node	Comment	Area (ac)	CN			
DA-RY-2	Watershed Area 2 from design report	1.53	85			
DA-RY-3B	Watershed Area 3B from design report	2.49	85			
DA-RY-4	Watershed Area 4 from design report	2.55	85			
DA-RY-3A	Watershed Area 3A from design report	5.24	85	Not Included in Model - runoff retained up to 25-year event		
Node	Comment	Inv Out	Inv In	Length (ft)	Diameter (in)	Material Type
RY-R-1	48" Culvert that connects railroad yard to Kaw Avenue pipe network	5458.79	5459.41 (1)	130	48	Concrete

TABLE 5 - CURVE NUMBER UPDATE

Node Name	New CN	Old CN
DA RR-01	78	81
DA-AR-01	93	90
DA-AR-02	87	80
DA-AR-03	81	70
DA-AR-04	78	66
DA-AR-05	76	64
DA-AR-06	77	75
DA-AR-07	79	81
DA-AR-08	88	89
DA-BG-01	82	83
DA-BG-02	86	78
DA-BG-03	87	77
DA-BG-04	82	72
DA-BG-05	93	94
DA-BG-06	94	94
DA-BG-07	94	94
DA-BG-08	94	94
DA-BG-09	87	87
DA-BG-10	94	94
DA-BG-11	88	87
DA-BG-12	91	88
DA-BG-13	77	64
DA-BG-14	88	81
DA-BG-15	90	85
DA-BG-16	91	86
DA-BG-17	87	82
DA-BG-18	84	80
DA-BG-19	83	83
DA-BG-20	84	84
DA-BG-21	86	85
DA-EBG-01	84	80
DA-EBG-02	91	87
DA-EBG-03	93	92
DA-EBG-04	87	86
DA-ID-01	90	91
DA-ID-02	94	94
DA-ID-03	92	92
DA-ID-04	90	90
DA-ID-05	88	87
DA-ID-06	87	89
DA-ID-07	80	79
DA-ID-08	78	71
DA-ID-09	78	74
DA-ID-10	85	85
DA-KMY-01	70	70
DA-KMY-02	89	89
DA-KMY-03	83	83
DA-KMY-04	77	77

Node Name	New CN	Old CN
DA-MG-01	79	86
DA-MG-02	85	76
DA-MG-03	83	61
DA-MG-04	77	76
DA-MG-05	85	68
DA-MG-06	86	66
DA-MG-07	85	69
DA-MG-08	86	67
DA-MG-09	85	60
DA-MG-10	85	72
DA-MG-11	88	80
DA-MG-12	88	81
DA-MG-13	89	88
DA-MG-14	84	62
DA-MG-15	87	62
DA-MG-16	86	78
DA-MG-17	85	60
DA-MG-18	90	87
DA-MG-19	90	92
DA-MG-20	89	89
DA-MG-21	88	87
DA-MG-22	87	69
DA-MG-23	84	81
DA-MG-24	87	87
DA-MG-25	88	90
DA-MG-26	88	88
DA-MG-27	88	88
DA-MG-28	86	83
DA-MG-29	85	79
DA-MG-30	92	89
DA-MG-31	88	84
DA-MG-32	78	79
DA-MG-33	74	74
DA-MSD-01	81	81
DA-MSD-02	82	82
DA-MSD-03	85	85
DA-MSD-04	85	85
DA-MSD-05	84	84
DA-MSD-06	85	85
DA-MSD-SS-01	85	85
DA-MSD-SS-02	82	82
DA-MSD-SS-03	83	83
DA-MSD-SS-04	82	82
DA-MSD-SS-05	79	79
DA-MSD-SS-06	83	83
DA-MSD-SS-07	81	81
DA-MSD-SS-08	80	81
DA-MSD-SS-09	83	83
DA-MSD-SS-10	86	87
DA-MSD-SS-11	75	83
DA-MSD-SS-12	80	86
DA-MSD-SS-13	81	81

Node Name	New CN	Old CN
DA-MT-01	96	96
DA-MT-02	96	95
DA-MT-03	89	89
DA-RY-2	85	85
DA-RY-3B	85	85
DA-RY-4	85	85
DA-UAR-01	82	56
DA-UAR-02	81	69
DA-UAR-03	88	84
DA-UAR-04	92	77
DA-UAR-05	88	74
DA-UAR-06	84	73
DA-UAR-07	94	94
DA-UAR-08	94	94
DA-UAR-09	93	93
DA-UAR-10	94	94
DA-UAR-11	91	91
DA-UAR-12	87	84
DA-UAR-13	79	78
DA-UBG-01	85	68
DA-UBG-02	86	87
DA-UBG-03	86	85
DA-UBG-04	82	58
DA-UBG-05	82	49
DA-UWA-01	84	81
DA-UWA-02	72	71
DA-WA-01	75	75
DA-WA-02	67	67
DA-WA-03	77	77
DA-WA-04	77	77
DA-WSD-01	86	89
DA-WSD-02	91	93
DA-WSD-03	87	90
DA-WSD-04	92	94
DA-WSD-05	91	92
DA-WSD-06	85	84
DA-WSD-07	88	83
DA-WSD-08	80	87
DA-WSD-09	85	85
DA-WSD-10	80	77
DA-WSD-11	78	80
DA-WSD-12	89	84
DA-WSD-13	79	83
DA-WSD-14	85	84
DA-WSD-15	79	83
DA-WSD-16	85	82
DA-WSD-17	89	89

TABLE 6 - 2013 RAINFALL SUMMARY

Date	BSB Shop Depth	CB-1 Depth	Duration (hr)	Note
5/22/2013	1.12	1.15	36.0	BG Trunk Lining potentially not completed
6/10/2013	0.24	0.16	23.0	Small storm depth
8/1/2013	0.68	1.08	10.0	Short storm duration
9/17/2013	0.62	0.54	28.0	
9/25/2013	0.54	0.53	34.0	
9/30/2013	0.45	0.39	12.0	Short storm duration

TABLE 7 - MODEL CORRELATION OUTPUT SUMMARY

Outfall	Location	Rain Gage	Time of Measured Peak	Measured Lag	Order	Time of Modeled Peak	Order	Model Lag	Peak Time Measured - Model Offset	% Offset Decrease[1]	Measured Volume (ac-ft)[2]	Modeled Volume (ac-ft)	% Volume Diff.
Buffalo Gulch	BG-O1	BSB Shop	14:40	0:00	1	15:12	1	0:00	0:32	-	5.9	6.5	-10.6%
Anaconda Road	AR	BSB Shop	14:40	0:00	1	15:12	1	0:00	0:32	-	1.61	1.45	9.8%
East Buffalo Gulch	EBG	BSB Shop	14:50	0:10	3	15:12	1	0:00	0:22	-	1.9	1.37	28.7%
Texas Avenue	TX	BSB Shop	15:00	0:20	4	15:30	4	0:18	0:30	-	2.2	4	-78.1%
Buffalo Gulch	BG-O1	Kelley Mine	14:40	0:00	1	14:48	1	0:00	0:08	75%	5.9	6.5	-10.6%
Anaconda Road	AR	Kelley Mine	14:40	0:00	1	14:48	1	0:00	0:08	75%	1.61	1.45	9.8%
East Buffalo Gulch	EBG	Kelley Mine	14:50	0:10	3	14:54	3	0:06	0:04	82%	1.9	1.37	28.7%
Texas Avenue	TX	Kelley Mine	15:00	0:20	4	14:54	3	0:06	0:06	80%	2.2	4	-78.1%

Notes:

1 - Decrease in the offset when comparing the results using the BSB Shop rainfall data versus Kelley Mine rainfall data

2 - Apparent baseflow values in BG (~0.6 - 2 cfs) and EBG (~0.35 - 1.7) subtracted from the flow prior to volume calculation

TABLE 8 - KAW AVENUE REROUTE CHANGES

Date 1/13/2015
HydroCAD Model Updates
Updates based on Design (WET) provided 1/13/2015

		Model Changes				
Node	Comment	Inv Out	Inv In	Length (ft)	Diameter (in)	Material Type
BG-R-24a	Broke BG-R-24 into 3 segments to reflect partial upgrade to Kaw Avenue. STA 1+00	5454.82	5463 (model)	216.5	21"x15"	Concrete
BG-R-24b	Kaw Reroute STA 1+00 to STA 2+25.5	5454.04	5454.72	125.5	36	PP
BG-R-24c	Kaw Reroute STA 2+25.5 to STA 5+40.9	5452.13	5453.94	315.4	36	PP
BG-R-25	Holland Ditch Invert Update		5452.13			

TABLE 9 - CONTINENTAL ROADSIDE CHANNEL ADDITION

Date 7/28/2014
HydroCAD Model Updates
Updates based on Design provided by PTS

Model Changes

Node	Comment	Area (ac)	CN			
DA-CRC-1	Watershed Area 1 from design report	9.93	82			
DA-CRC-2	Watershed Area 2 from design report	5.13	79			
DA-CRC-3	Watershed Area 3 from design report	5.34	81			
DA-CRC-4	Combined watershed areas 4 & 5 from design report	1.4	79			
Node	Comment	Inv Out	Inv In	Length (ft)	Diameter (in)	Material Type
CRC-R-1	Designed HDPE Pipe that routes Areas 1 & 2 to the MSD	5480.9	5499.55	1885.4	24	HDPE
		Inv Out	Inv In	Length (ft)	Manning's	Section
MSD-CRC	Reach of MSD from CRC to the outfall at MSD-TX	5472	5480.9	155	0.04	15'x6' 3:1

TABLE 10 - MAGNITUDE CHANGES TO MODEL RESULTS

Model	Outfall	Node	Rainfall Event	Peak Flow (cfs)	Peak Time (hr)	Comment
Existing Conditions 9-2014	Anaconda Road	AB-OUT	5-Year	14.9	10.04	Trunk line updated
TREY NOAA type I Sep2009-adjusted	Anaconda Road	AB-OUT	5-Year	14.8	9.99	
Existing Conditions 9-2014	Buffalo Gulch	BG-01	5-Year	73.05	10.07	Includes trunk line update, railroad yard addition and Kaw Avenue Re-route
TREY NOAA type I Sep2009-adjusted	Buffalo Gulch	BG-01	5-Year	102.24	9.99	

Attachment A

Constructed and Proposed Project Plans

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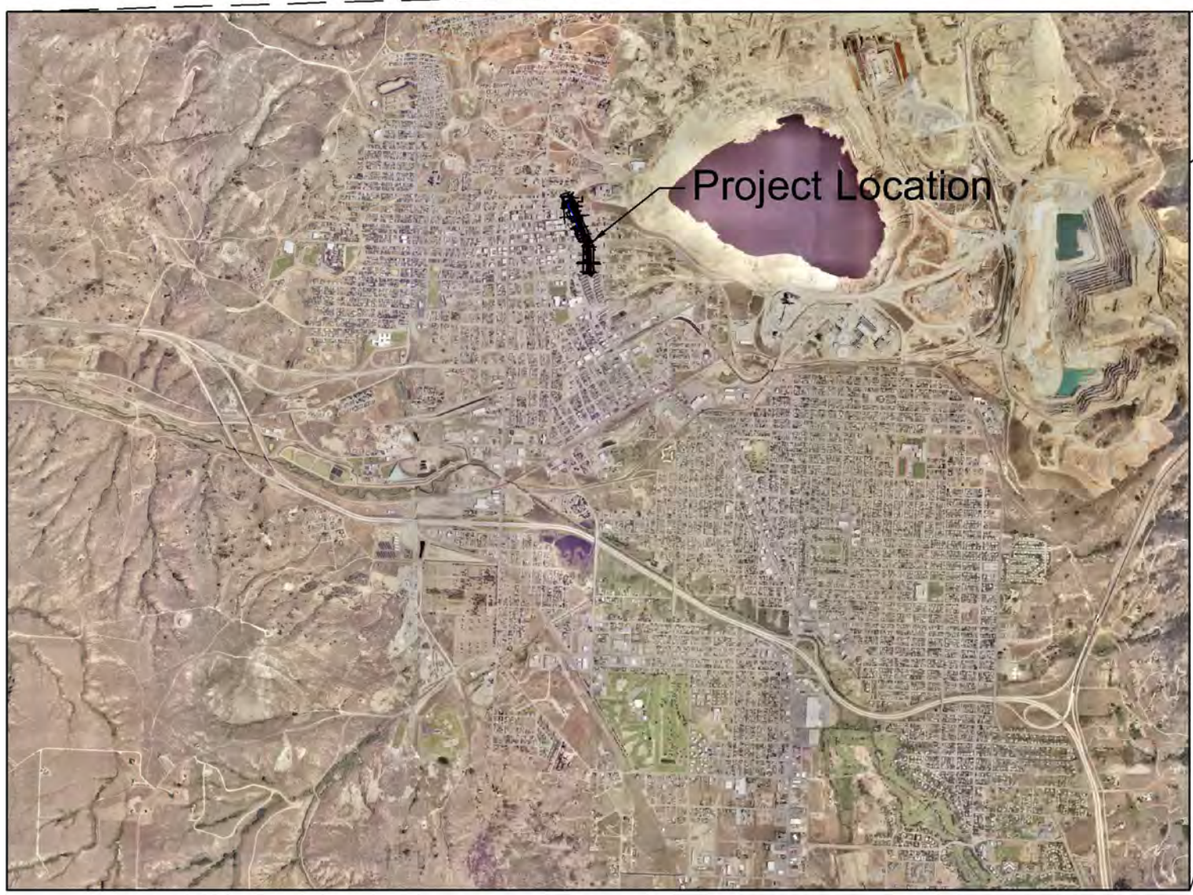
LOCATED IN BUTTE, SILVER BOW COUNTY, MONTANA



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SHEET INDEX	
SHT. No.	DRAWING TITLE
T-1	TITLE SHEET
C-1	SITE PLAN / LAYOUT
P-1	P&P STA 0+00 TO 5+00
P-1	P&P STA 5+00 TO 10+00
P-1	P&P STA 10+00 TO 15+00
P-1	P&P STA 15+00 TO 20+00
P-1	P&P STA 18+00 TO 20+32

EXISTING FEATURES LEGEND

EXISTING UTILITIES SHOWN WERE LOCATED PER BUTTE SILVER BOW GIS FILES

OHP	OVERHEAD POWER LINES	STM	STORM DRAIN LINES
UGP	UNDERGROUND POWER LINES	SLW	SILVER LAKE WATER MAIN
WTR	WATER LINES		FENCE LINE
GAS	GAS LINES		
TEL	TELECOMMUNICATIONS		
SAN	SANITARY SEWER LINES		

No.	Revision/Issue	Date

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TITLE PAGE

BUTTE - SILVER BOW, MONTANA

SHEET
1 of 7

T-1

Course	Bearing	Distance
L1	N 33°15'38" E	15.581'
L2	N 17°52'14" E	5.205'
L3	N 21°02'12" W	6.402'
L4	N 27°31'21" W	73.645'
L5	N 00°55'06" E	2.624'
L6	N 05°45'28" W	33.013'
L7	N 27°35'05" W	20.778'
L8	N 22°51'57" W	34.688'
L9	N 24°26'14" W	26.308'
L10	N 28°51'03" W	24.521'
L11	N 26°54'36" W	27.579'
L12	N 27°07'38" W	51.588'
L13	N 28°17'37" W	67.149'
L14	N 19°11'38" W	3.050'
L15	N 11°12'07" W	36.153'
L16	N 09°35'33" W	12.365'
L17	N 16°03'09" W	4.865'
L18	N 27°45'39" W	36.357'
L19	N 11°02'59" W	26.845'
L20	N 02°55'14" W	20.423'
L21	N 07°00'46" E	17.653'

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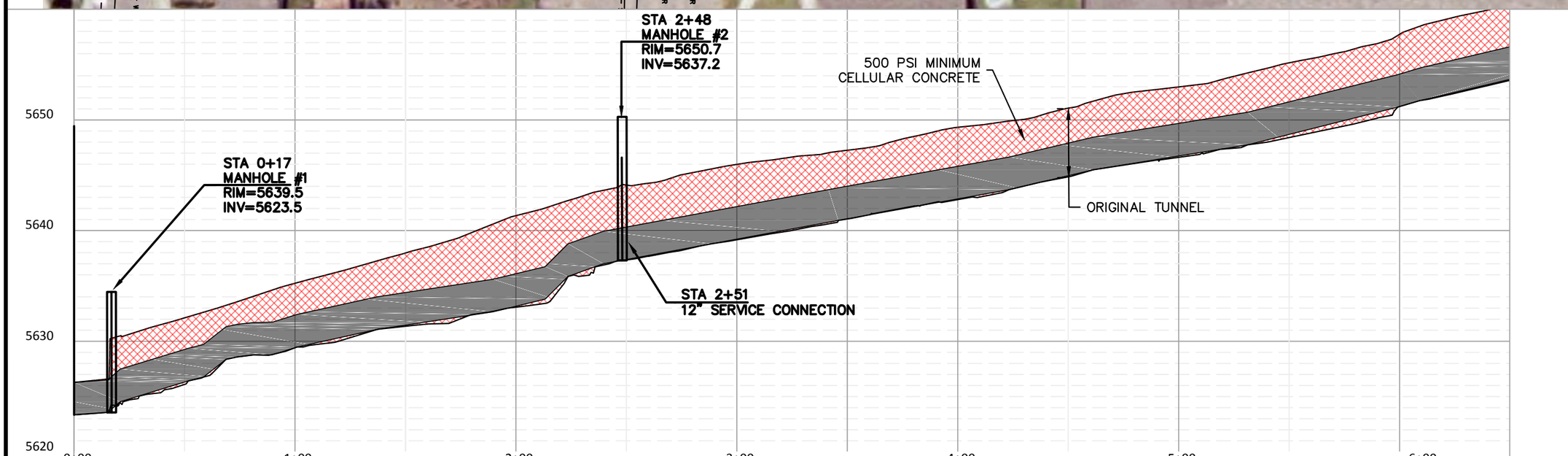
PROJECT LAYOUT

BUTTE - SILVER BOW, MONTANA

SHEET
2 of 7

C-1



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STA 0+00 to STA 5+00

BUTTE - SILVER BOW, MONTANA

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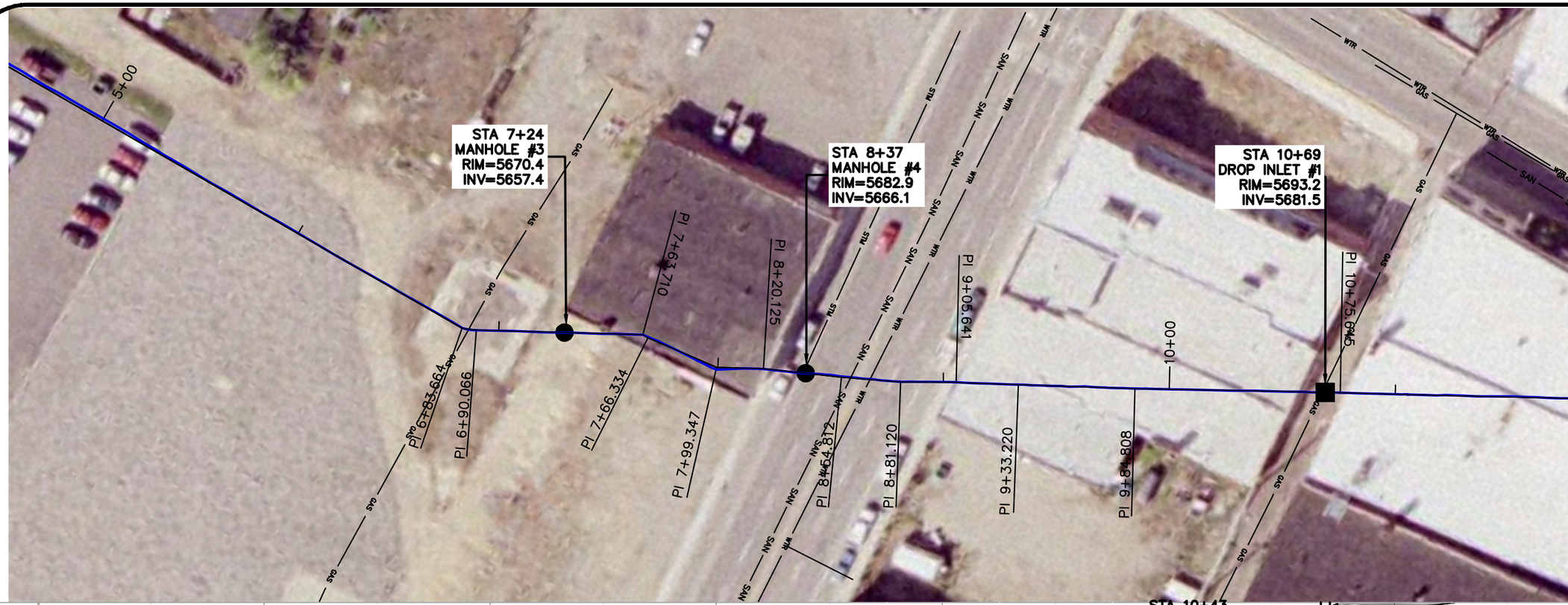
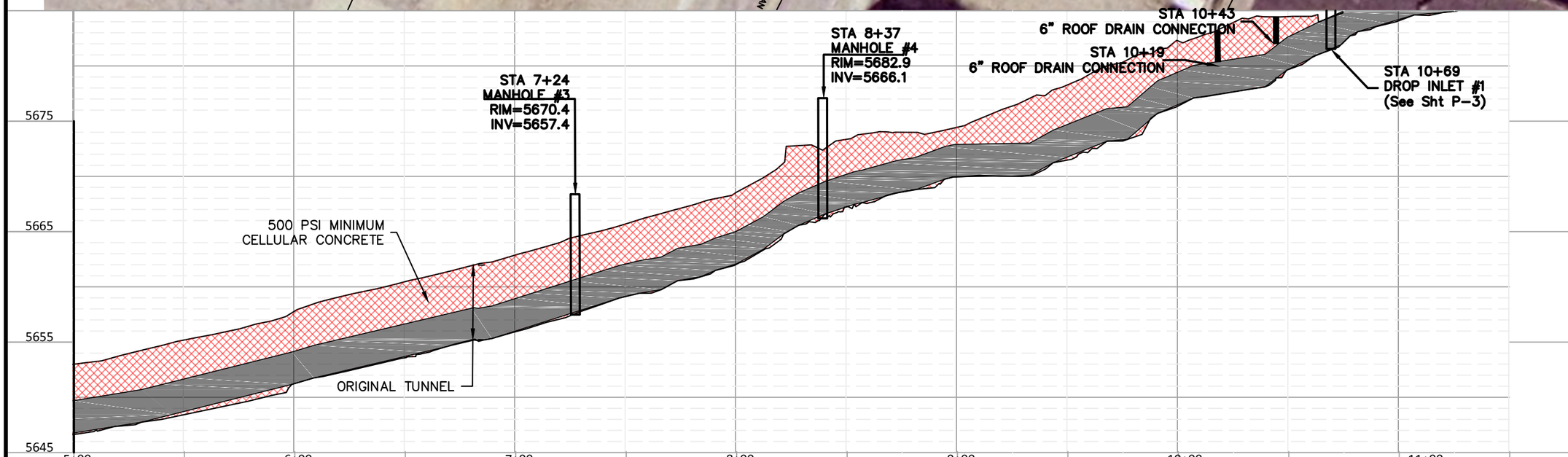
3 of 7

P-1





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STA 5+00 to STA 10+00

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4 OF 7

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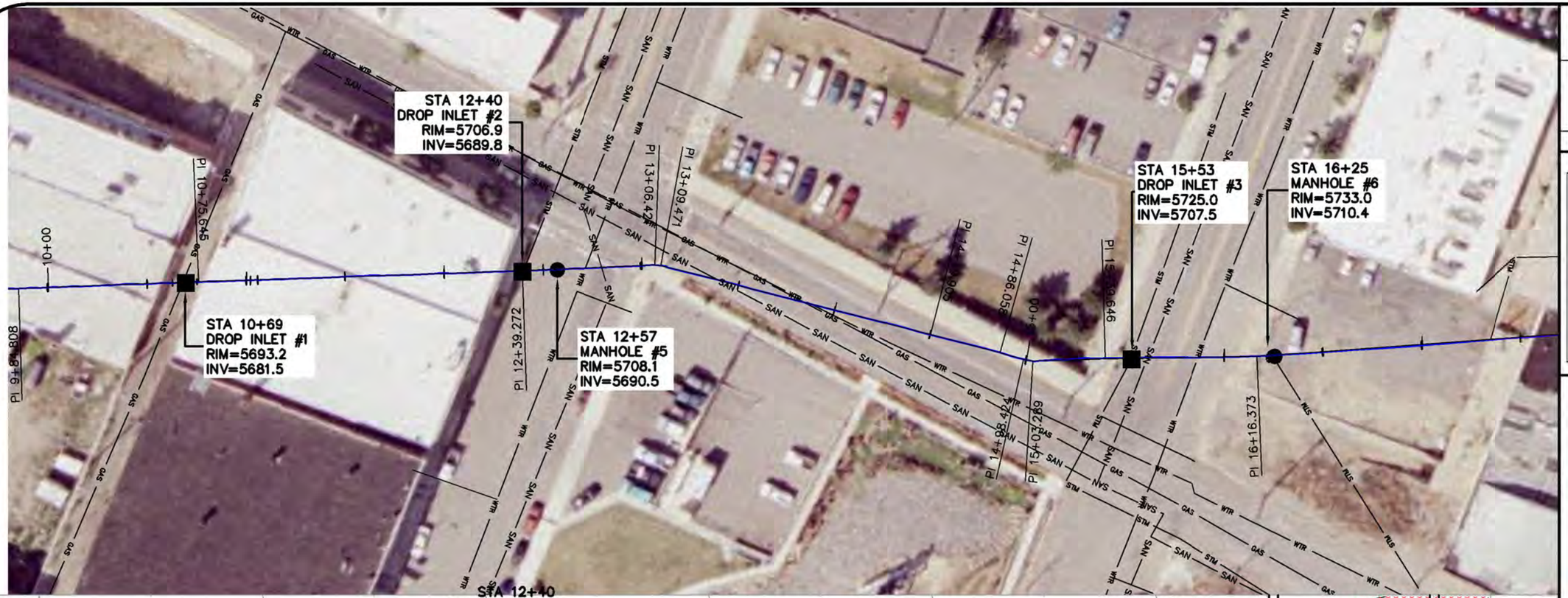

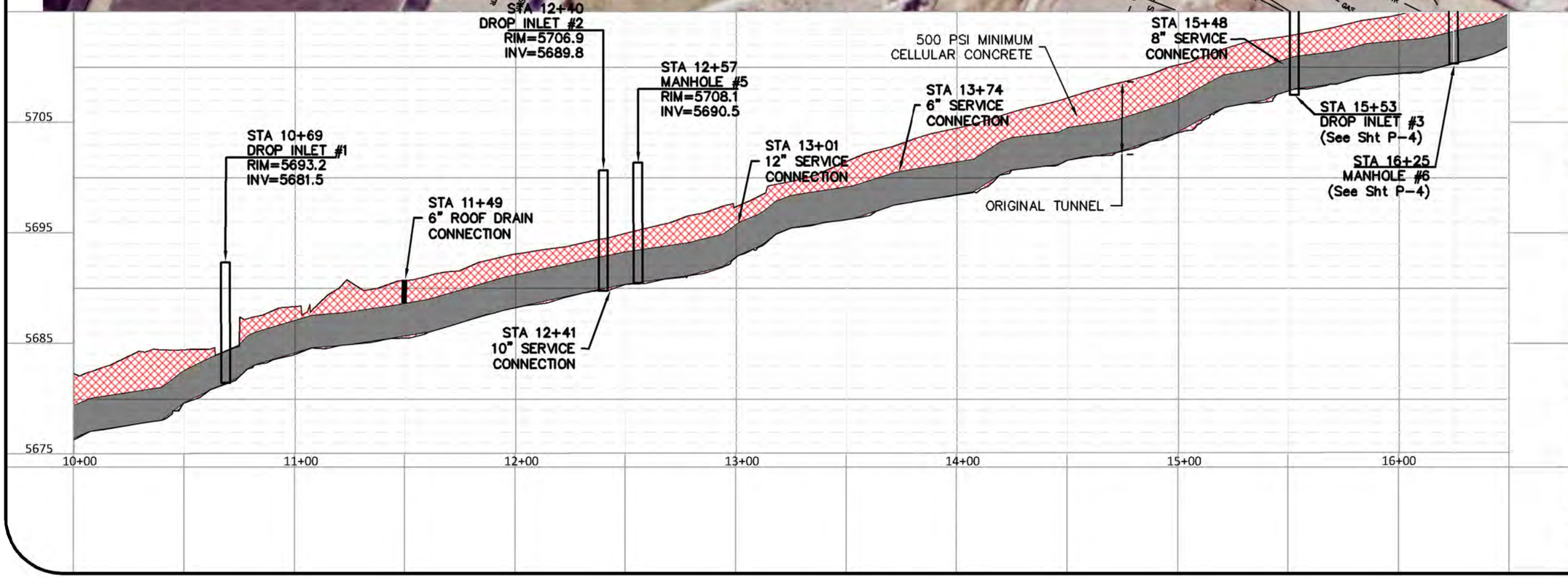

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STA 10+00 to STA 15+00

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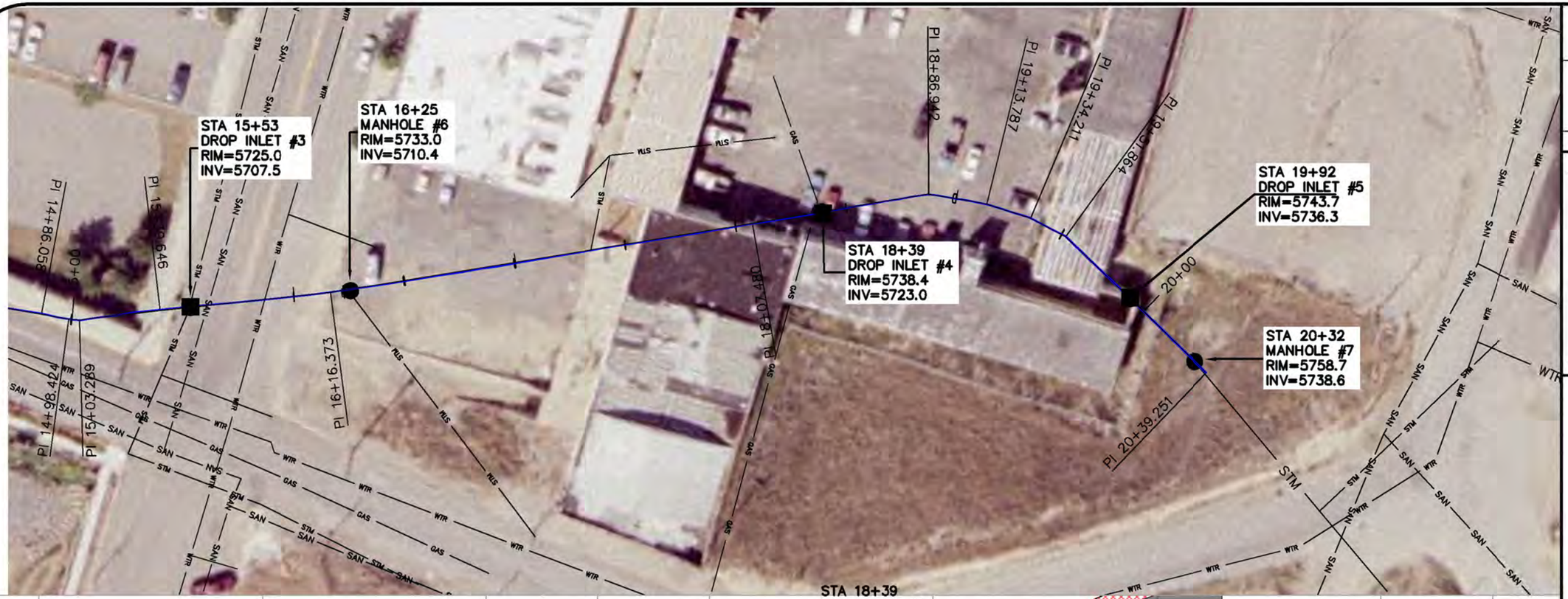

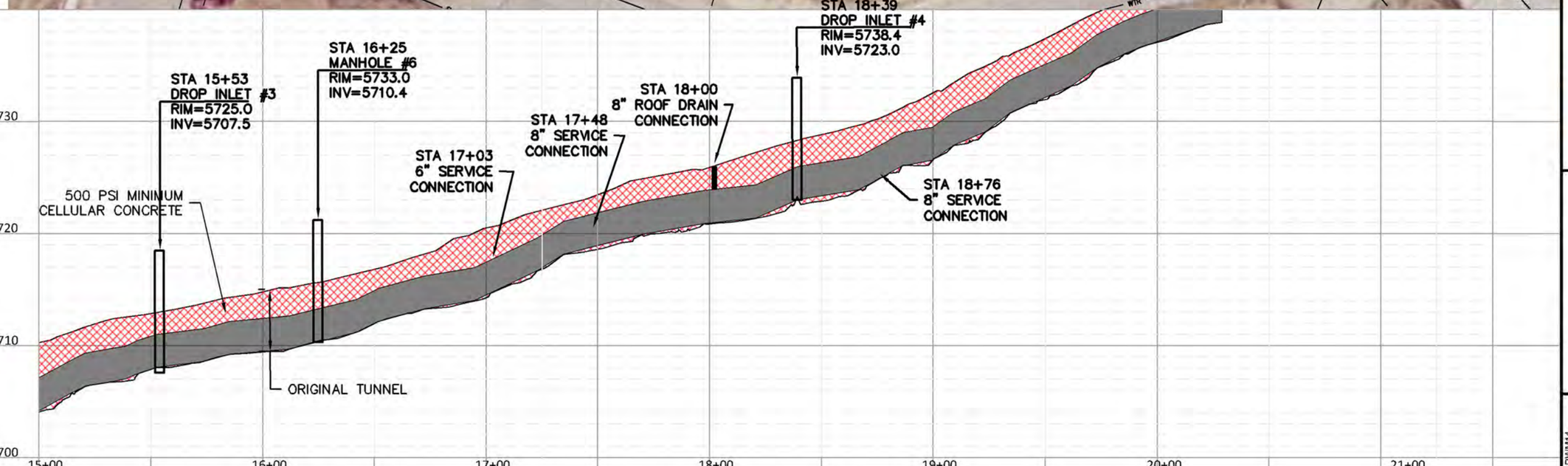

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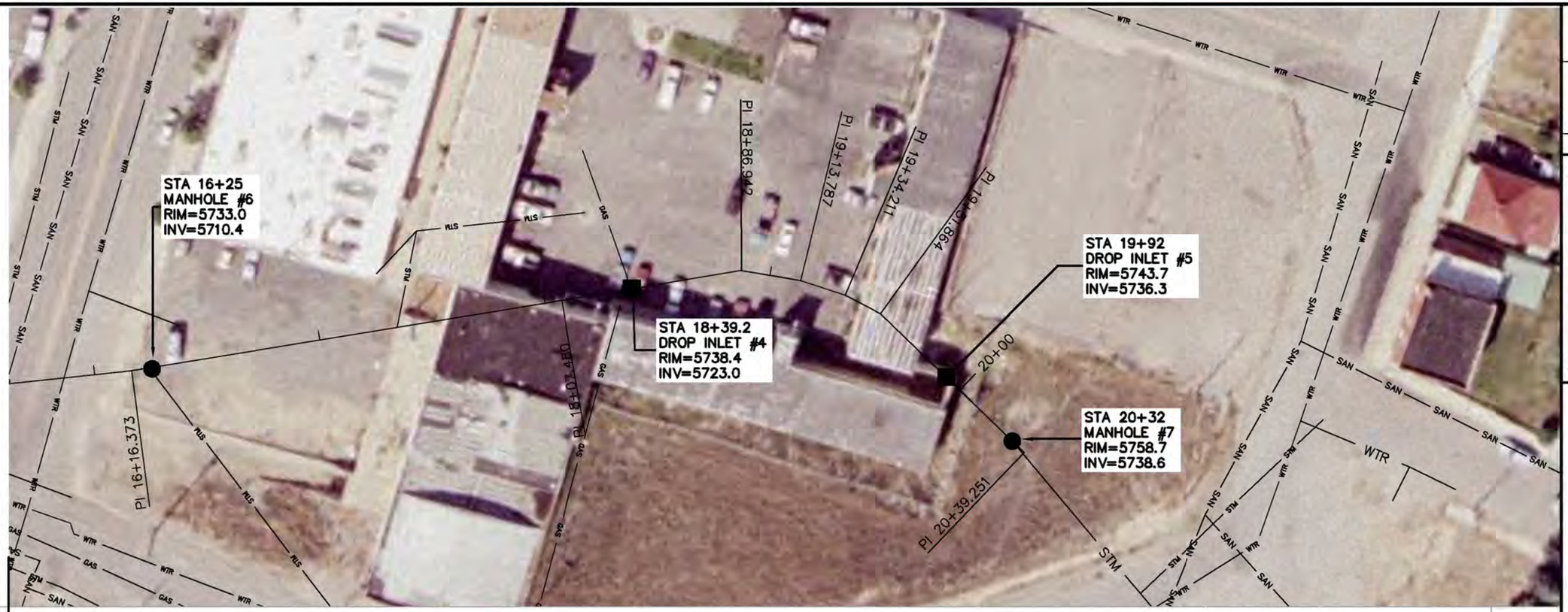

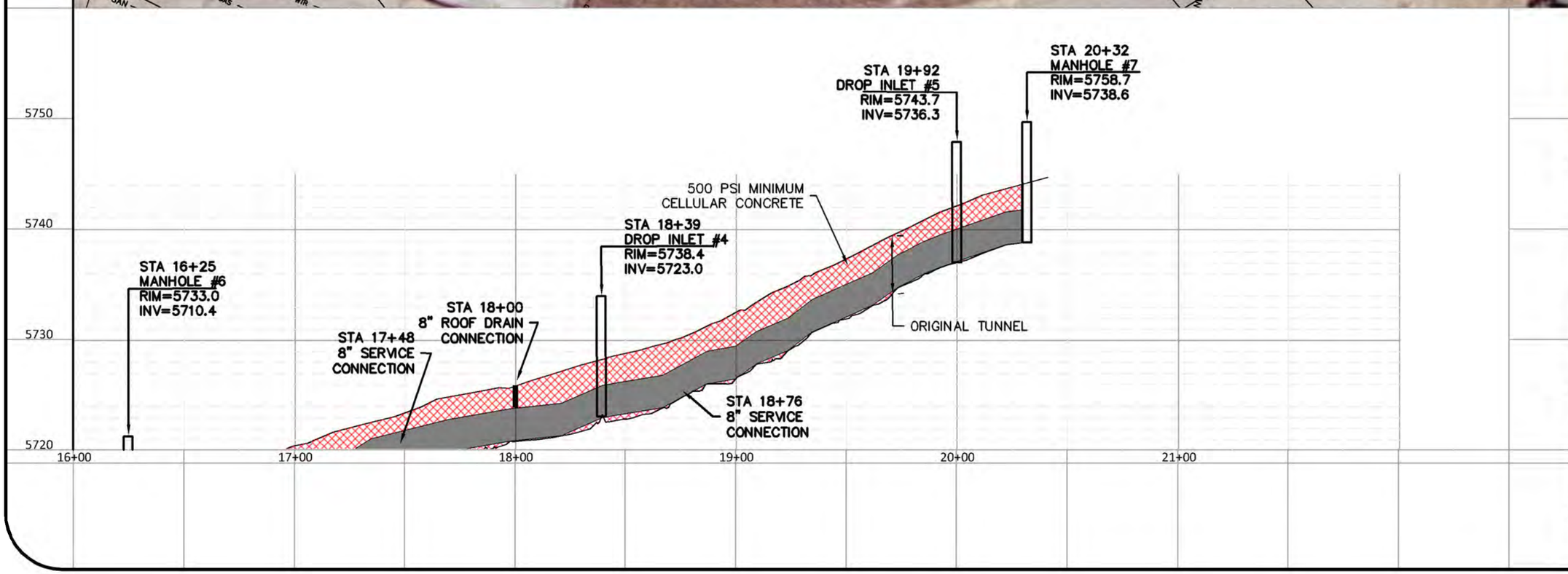

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STA 18+00 to STA 20+32

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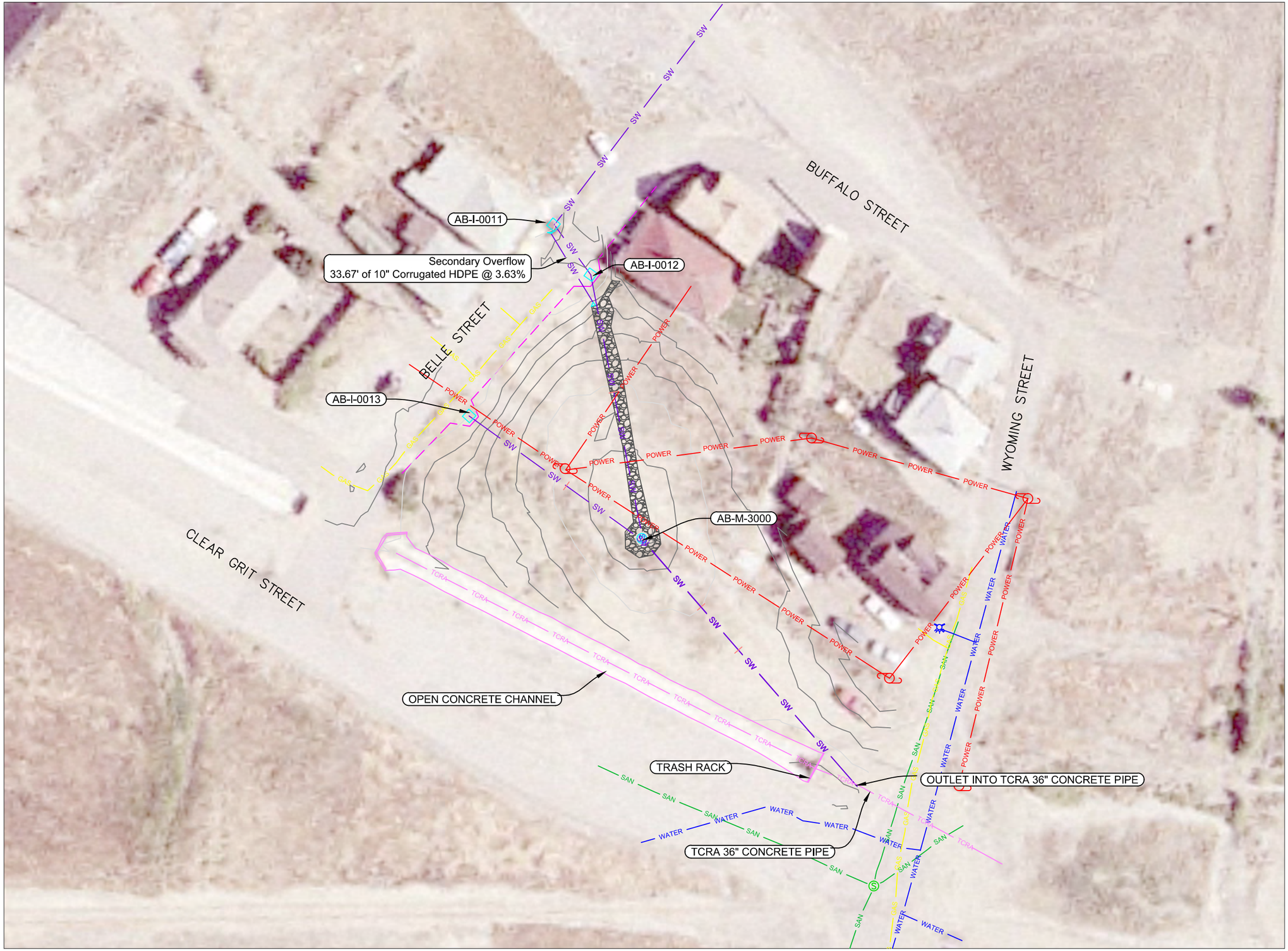

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BELLE AND BUFFALO
STORM SEWER AS-BUILT PLAN

SITE MAP

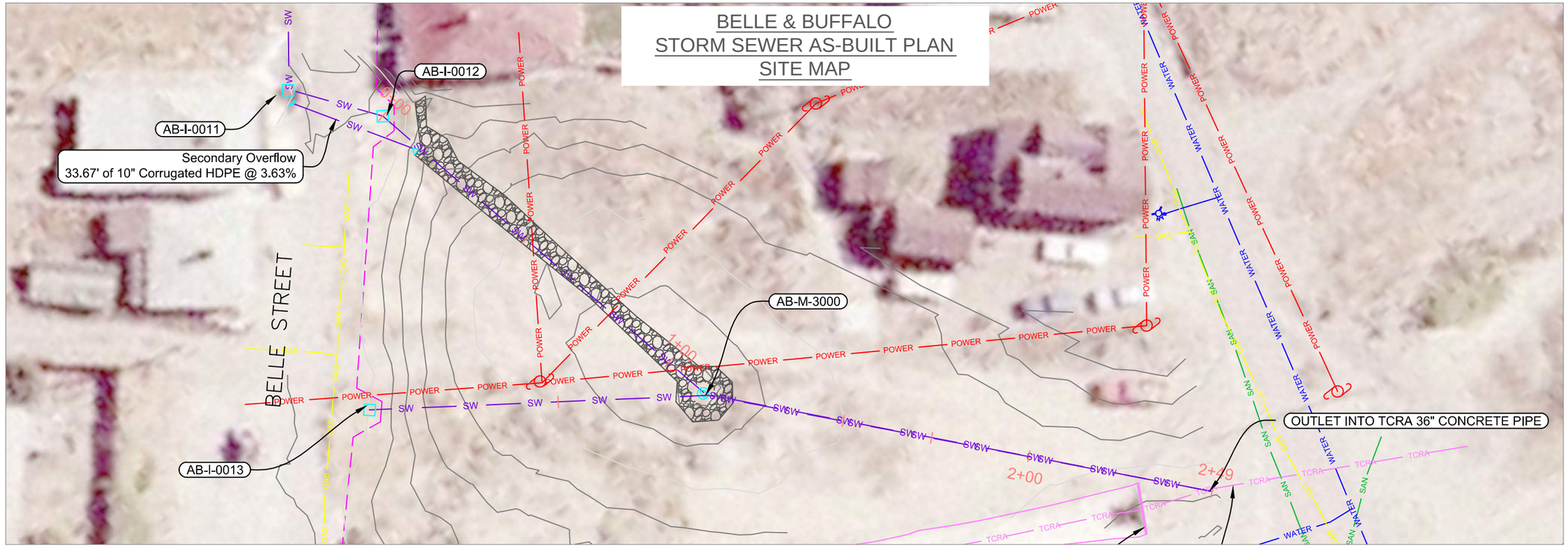
BUTTE, MONTANA

SHEET
3 of 5

C-1AB

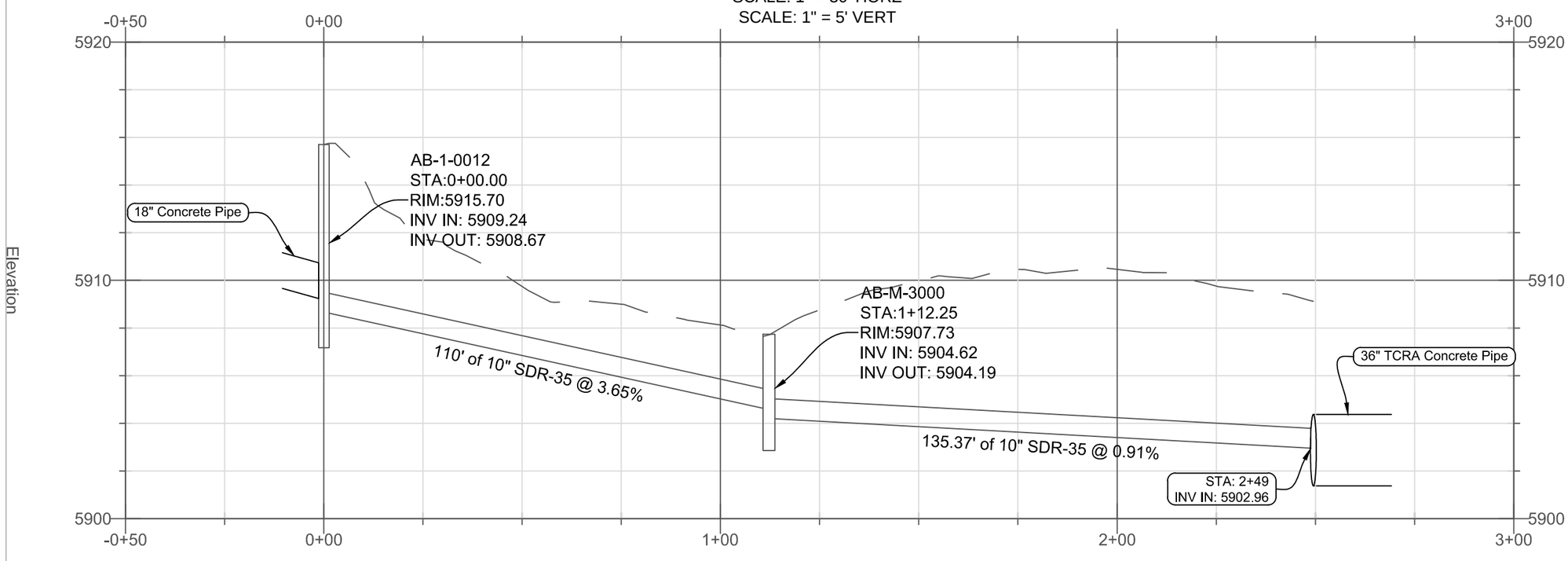
M:\BSBPWM21\CAD\Belle & Buffalo As-Built.dwg

BELLE & BUFFALO
STORM SEWER AS-BUILT PLAN
SITE MAP



STORM SEWER AS-BUILT PROFILE

SCALE: 1" = 30' HORZ
SCALE: 1" = 5' VERT



No.	Revision/Issue	Date

BUTTE-SILVER BOW
5-2-77
THE RICHEST HILL ON EARTH
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

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480 E. Park Street
Butte, MT 59701

Suite 103
1321 8th Ave N.
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S

0 15 30

JOB # BSBPWM21
DATE: 6/28/2013
DRAFTER: BS/MT/SF
CHK'D BY: KS

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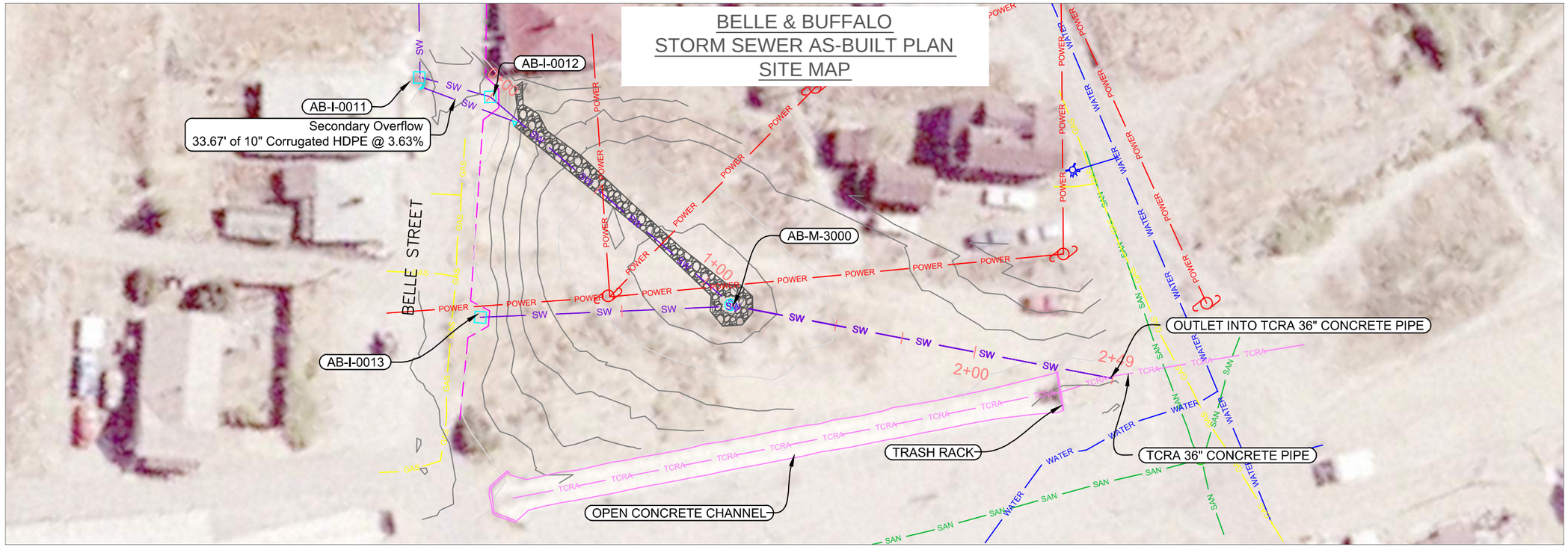
BELLE AND BUFFALO
STORM SEWER AS-BUILT PLAN
ROCK DITCH
ALIGNMENT
BUTTE, MONTANA

SHEET
4 of 5

P-1AB

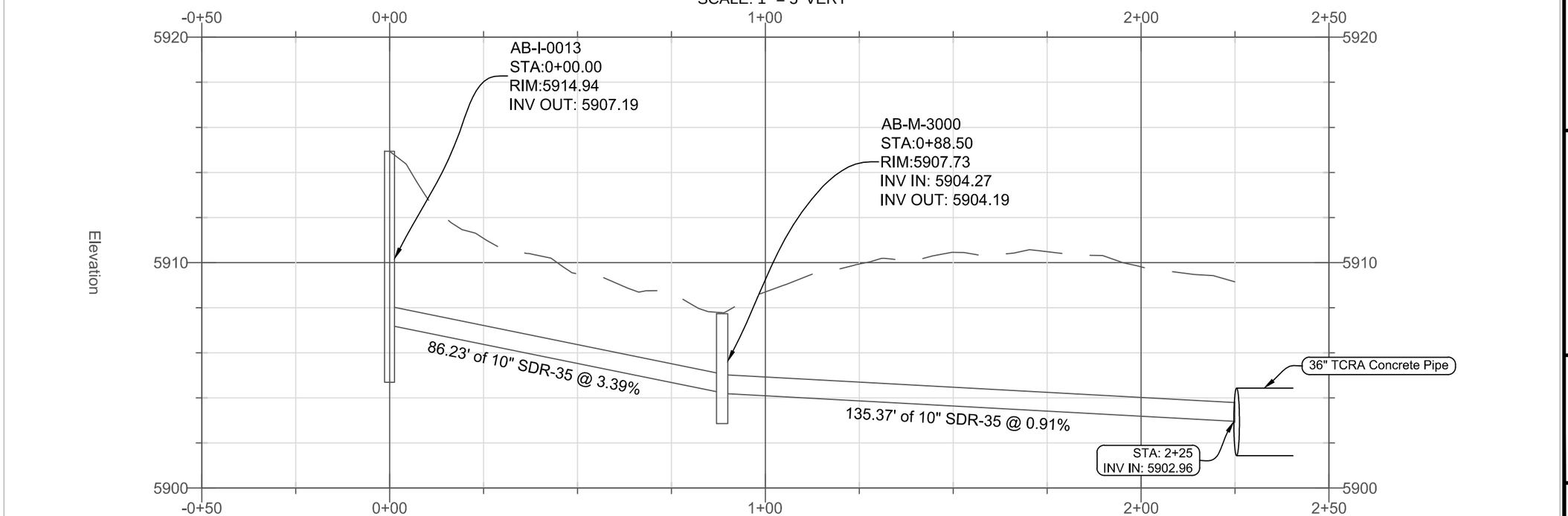
M:\BSBPWM21\CAD\Belle & Buffalo As-Built.dwg

BELLE & BUFFALO
STORM SEWER AS-BUILT PLAN
SITE MAP



STORM SEWER AS-BUILT PROFILE

SCALE: 1" = 60' HORZ
SCALE: 1" = 5' VERT



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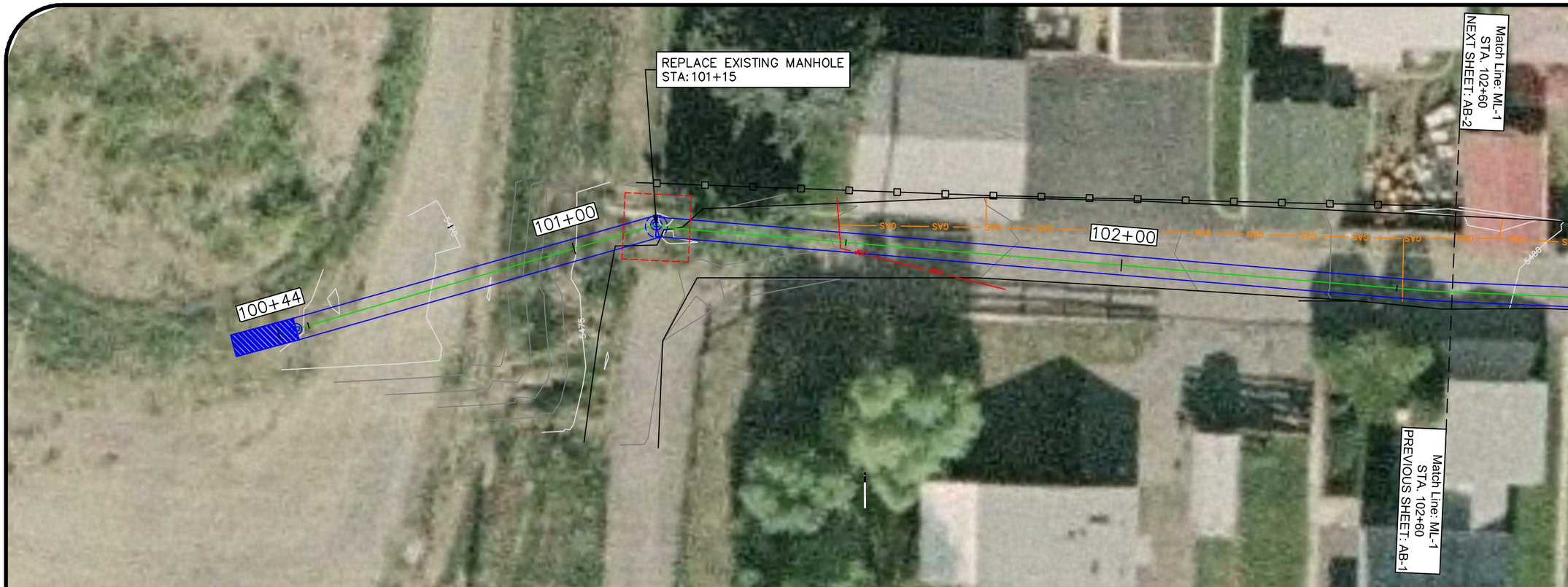
BELLE AND BUFFALO
STORM SEWER AS-BUILT PLAN
ALIGNMENT (2)
BUTTE, MONTANA

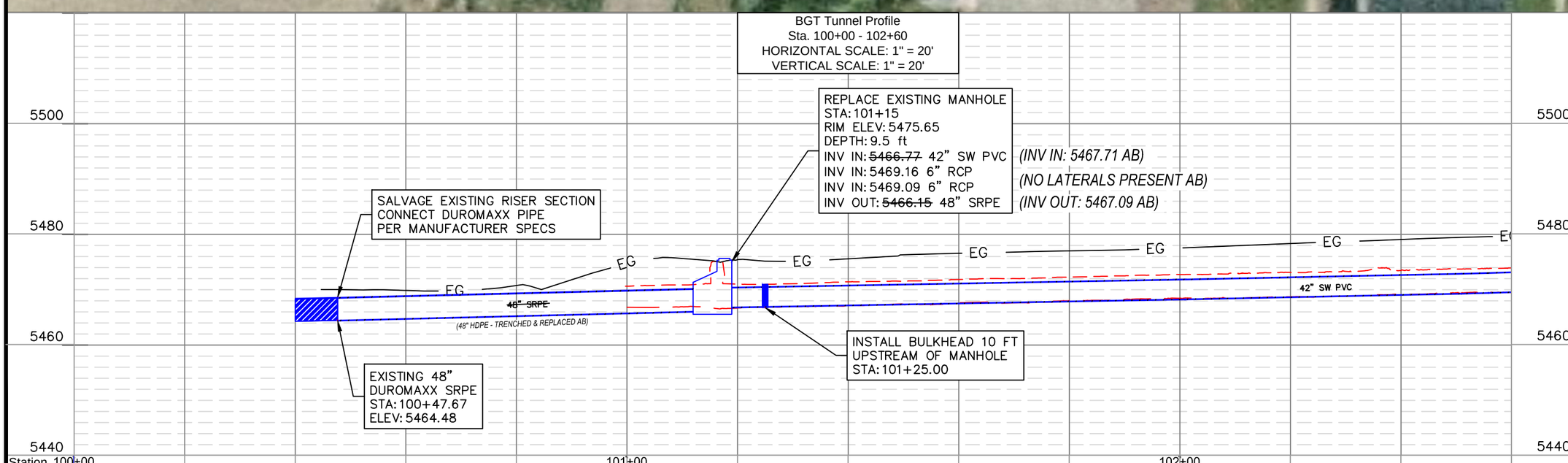
SHEET
5 of 5

P-2AB

M:\BSBPWM21\CAD\Belle & Buffalo As-Built.dwg



BGT Tunnel Profile
Sta. 100+00 - 102+60
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 20'

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BGT REHABILITATION PROJECT - PHASE II

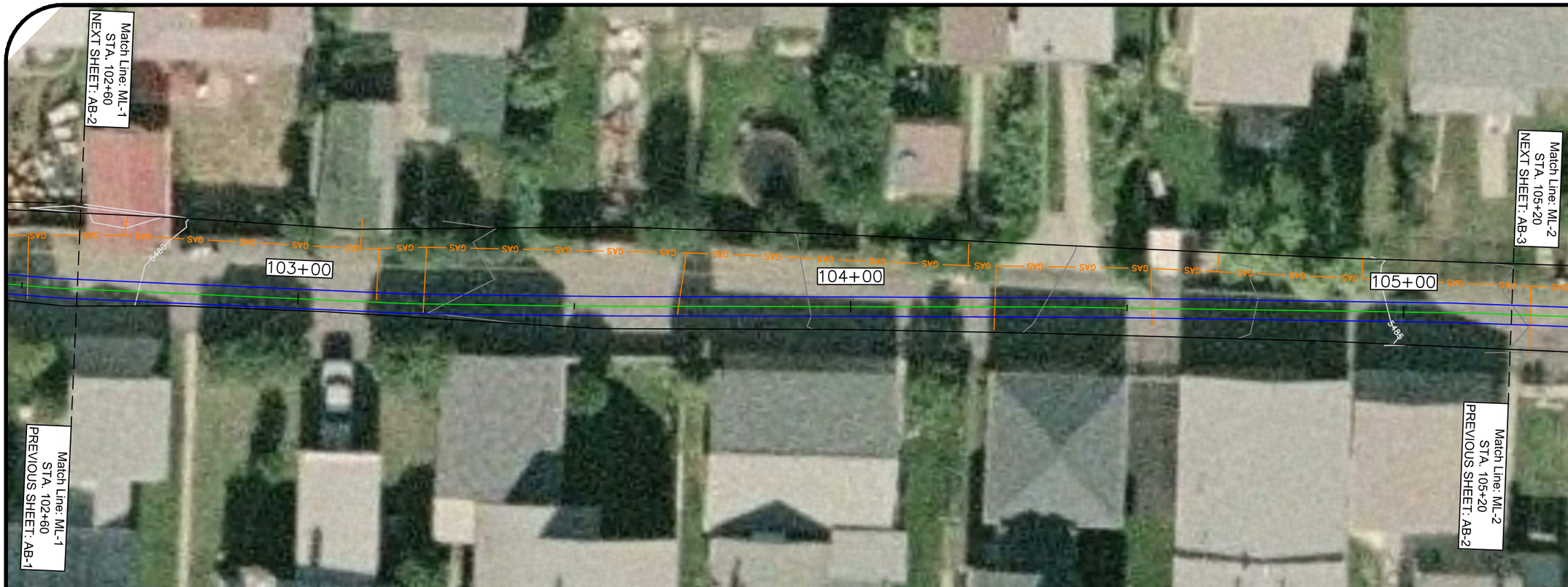
BGT AS-BUILT PLANS

STA. 100+00 - 102+60

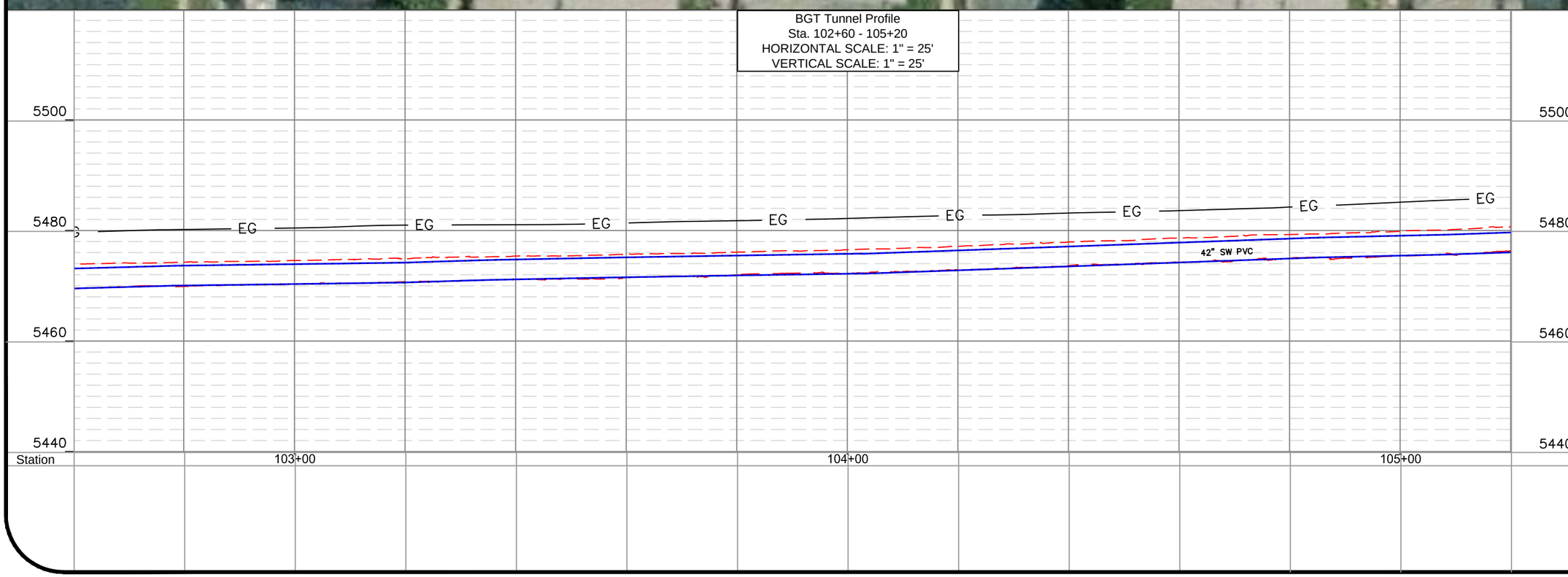
BUTTE, MT

SHEET
1 of 29

AB-1



BGT Tunnel Profile
Sta. 102+60 - 105+20
HORIZONTAL SCALE: 1" = 25'
VERTICAL SCALE: 1" = 25'



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SCALE 1" = 20'
0 10 20

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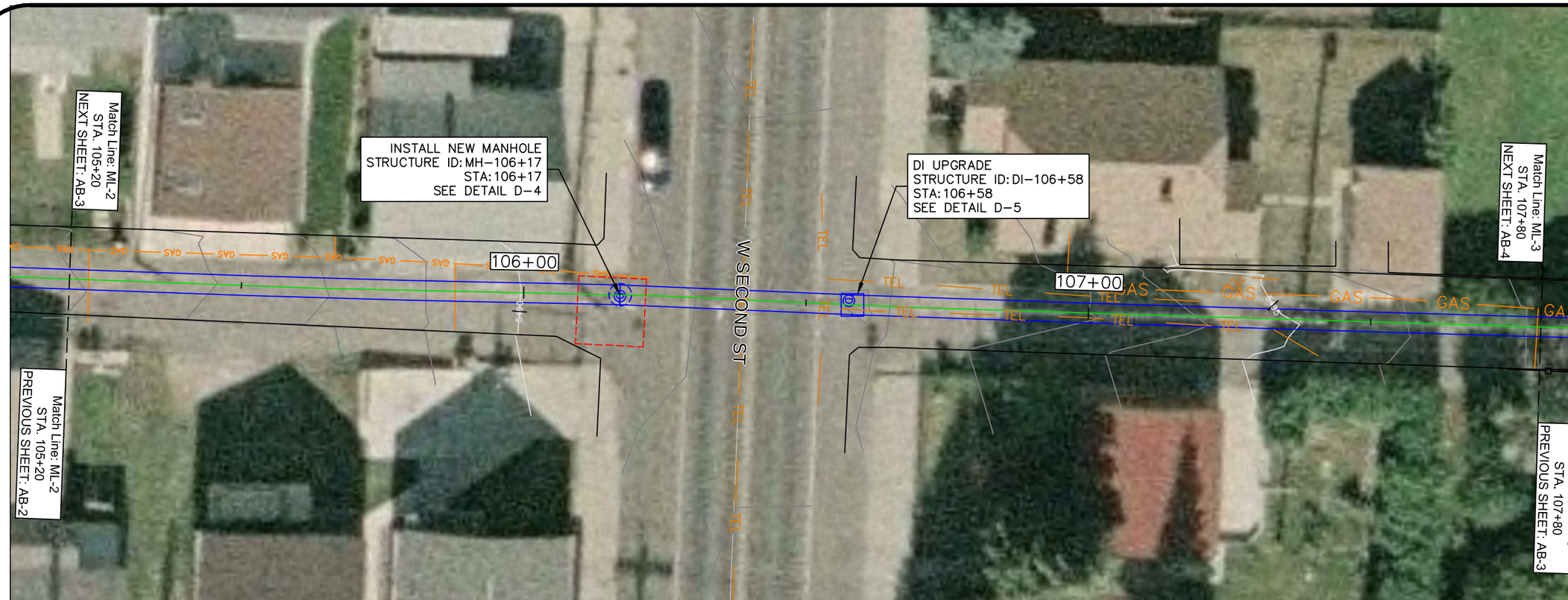
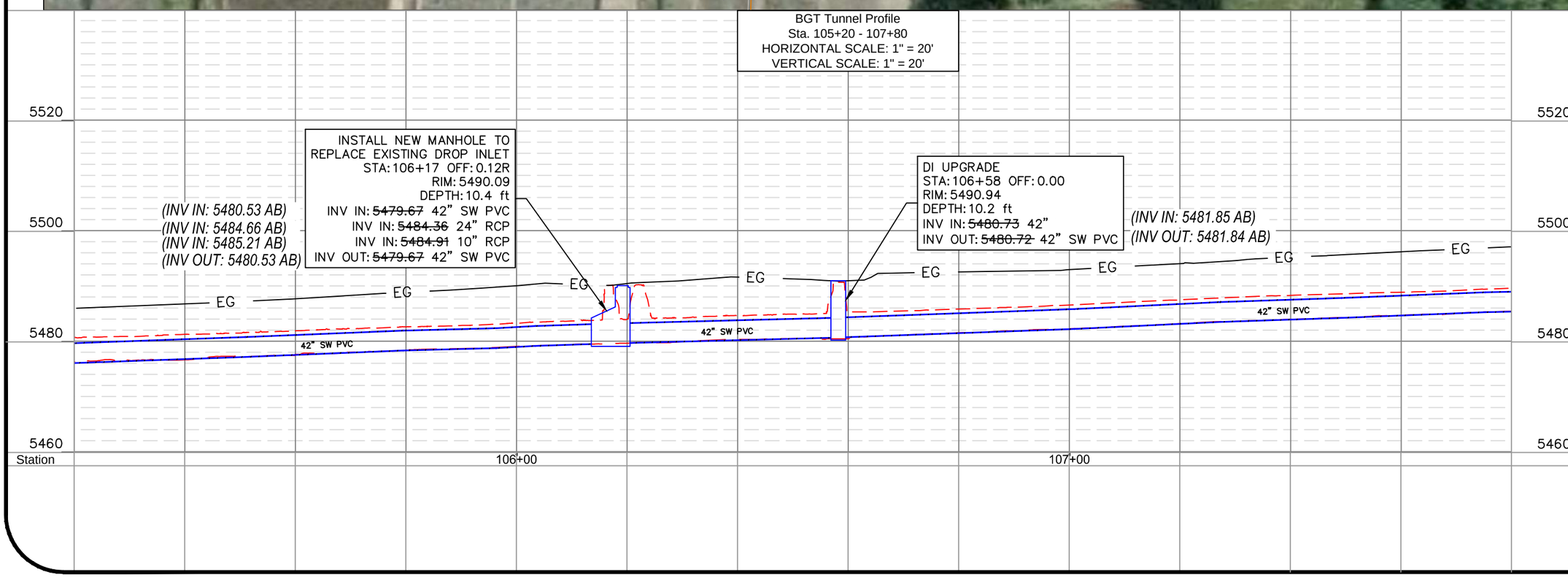
BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS
STA: 102+60 - 105+20
BUTTE, MT

SHEET
2 of 29

AB-2



BGT Tunnel Profile
Sta. 105+20 - 107+80
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT - PHASE II

BGT AS-BUILT PLANS

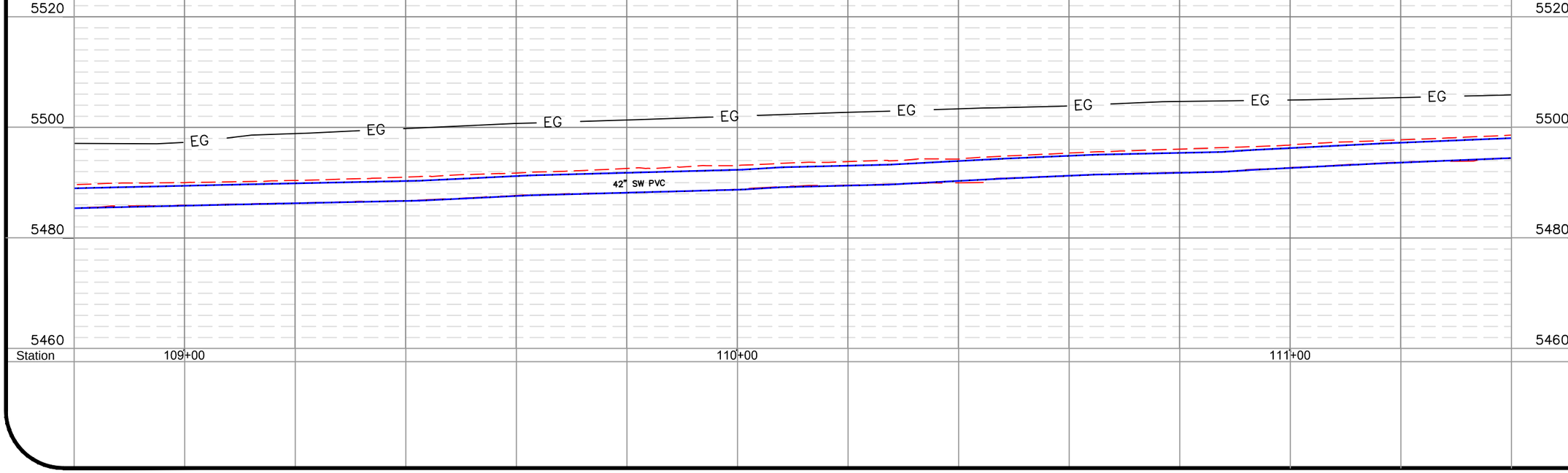
STA: 105+20 - 107+80

BUTTE, MT

SHEET
3 of 29

AB-3

BGT Tunnel Profile
Sta. 107+80 - 110+40
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 20'
0 10 20

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BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS

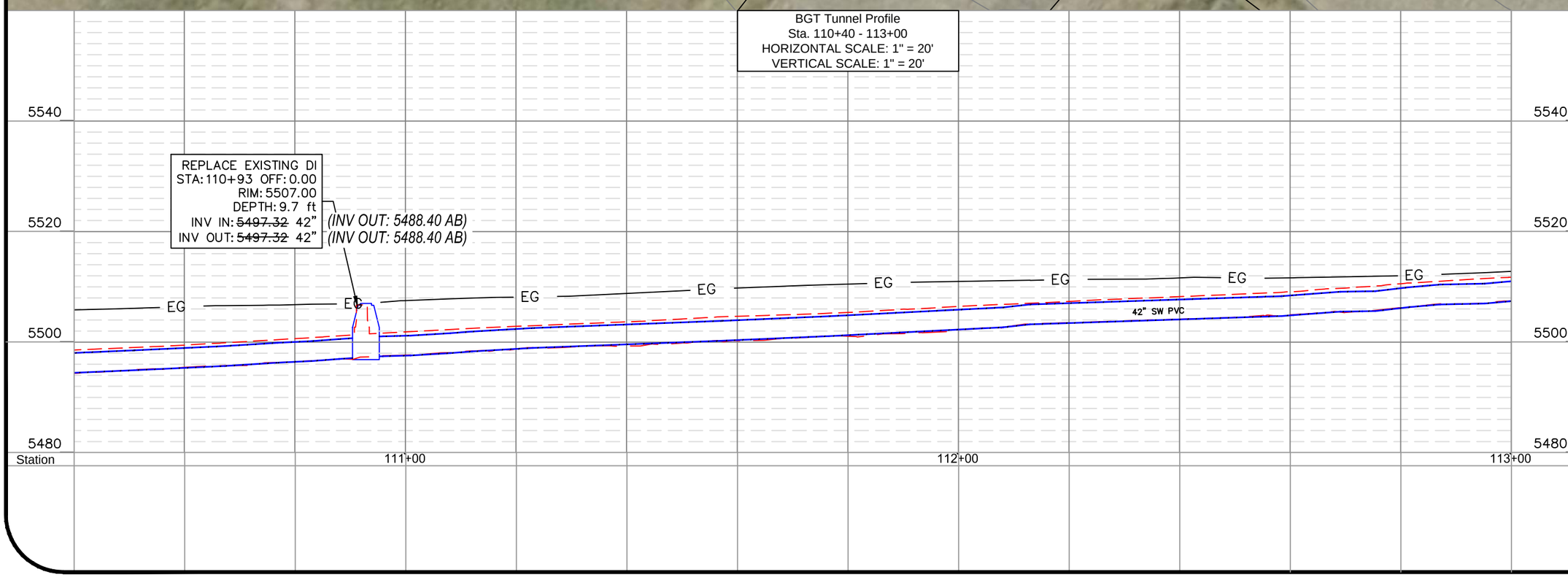
STA: 107+80 - 110+40

BUTTE, MT

SHEET
4 of 29

AB-4

BGT Tunnel Profile
Sta. 110+40 - 113+00
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 20'
0 10 20

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BGT REHABILITATION PROJECT - PHASE II

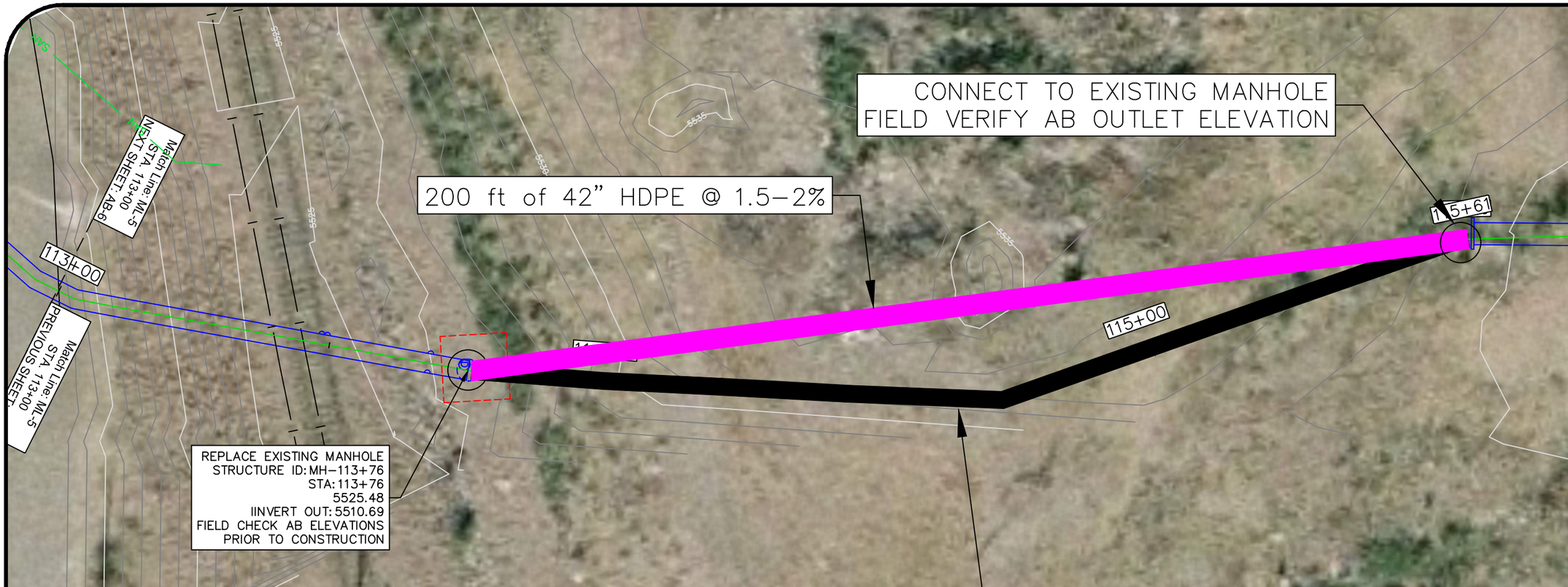
BGT AS-BUILT PLANS

STA: 110+40 - 113+00

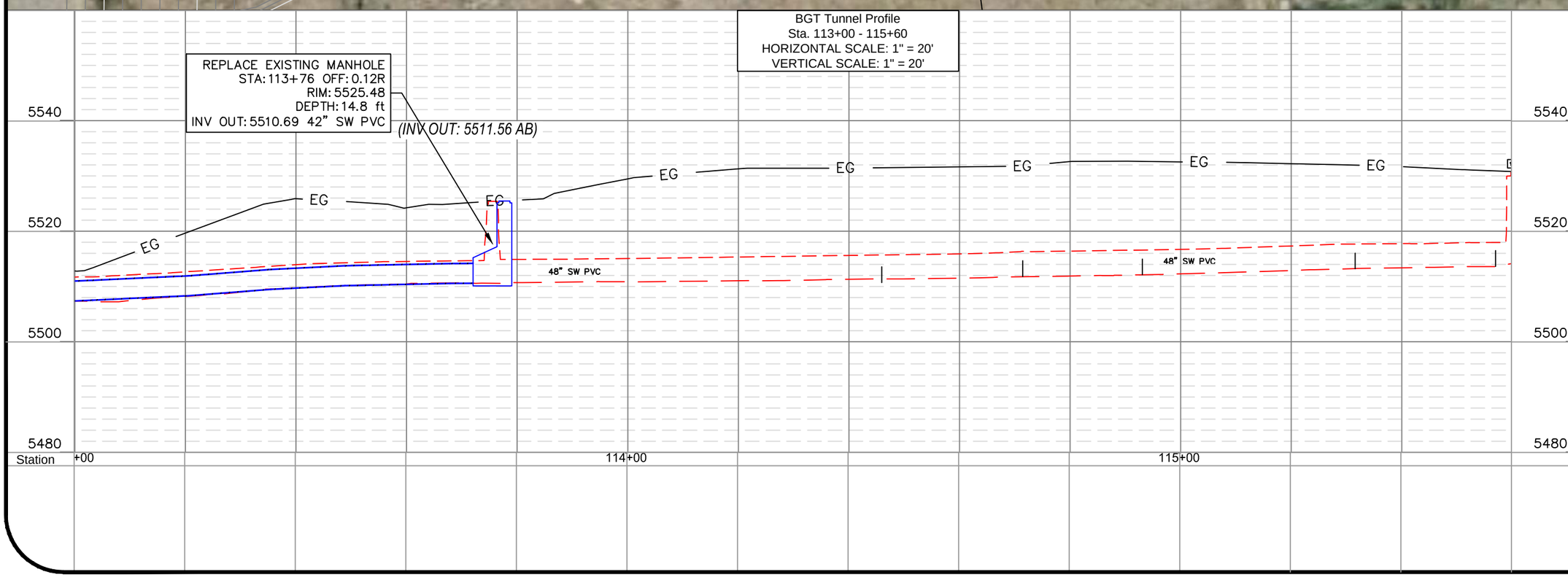
BUTTE, MT

SHEET
5 of 29

AB-5



BGT Tunnel Profile
Sta. 113+00 - 115+60
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 20'
0 10 20

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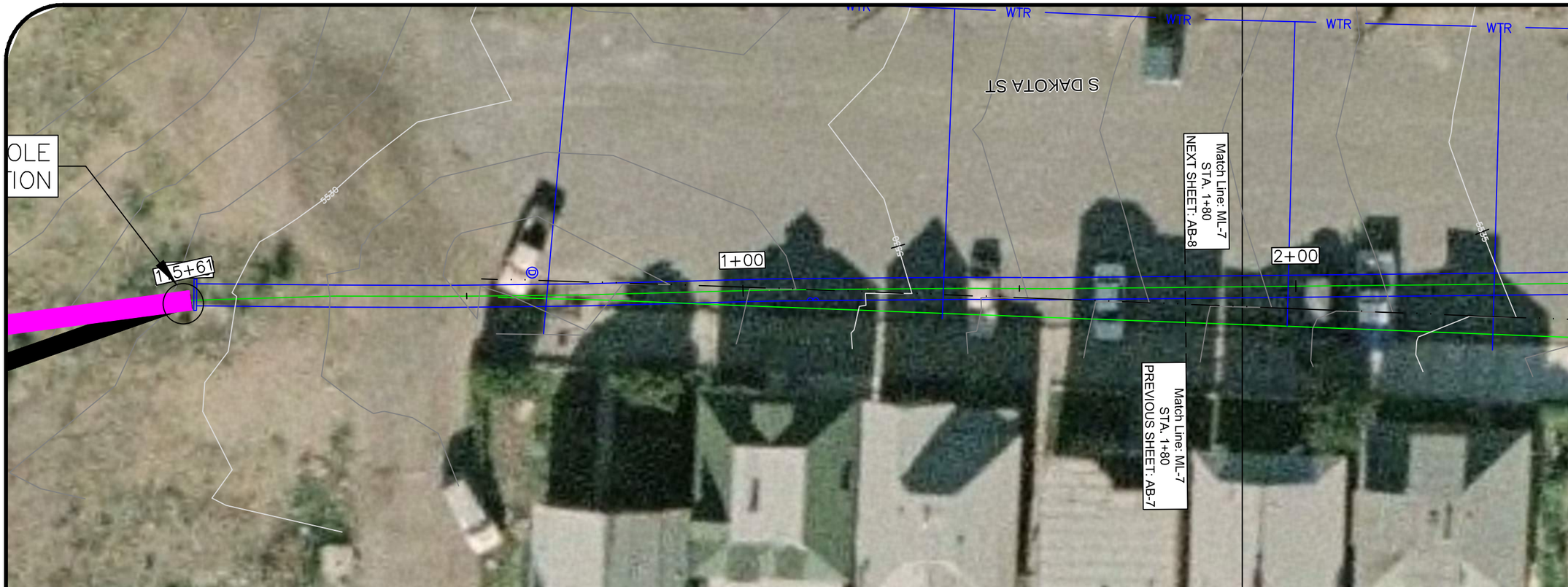
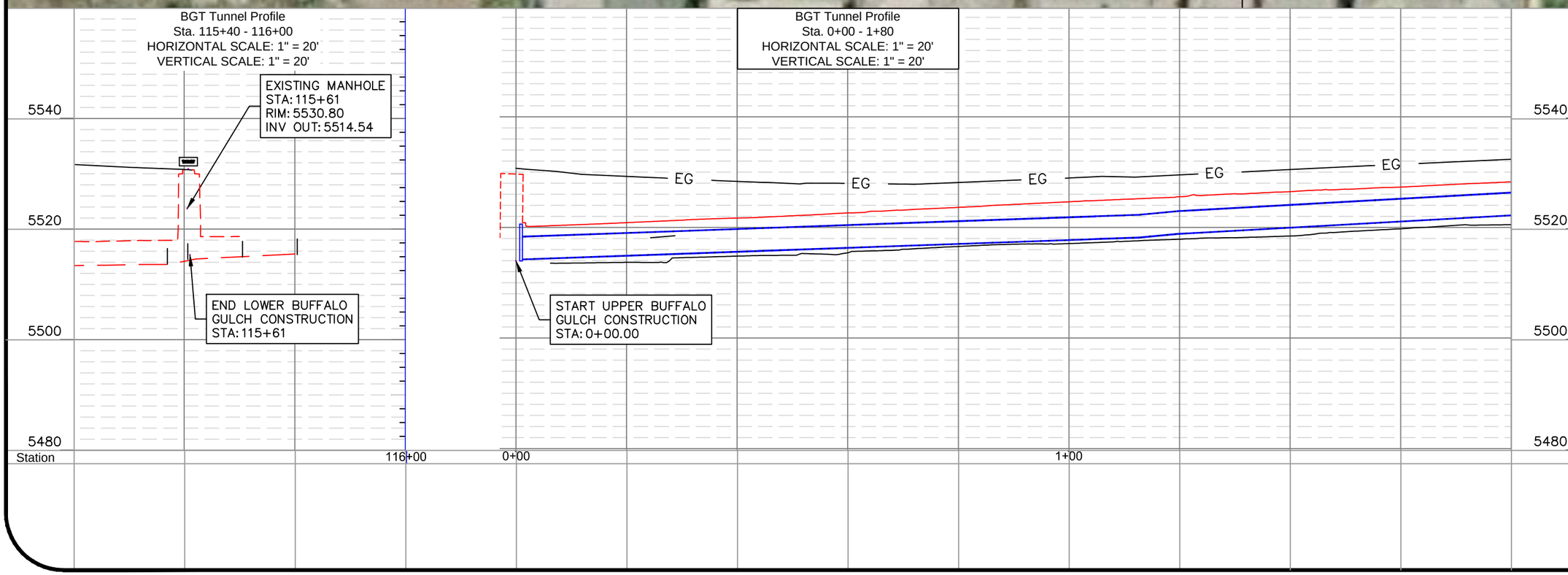
BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS
STA: 113+00 - 115+60
BUTTE, MT

SHEET
6 of 29

AB-6





No.	Revision/Issue	Date

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BGT REHABILITATION PROJECT - PHASE II

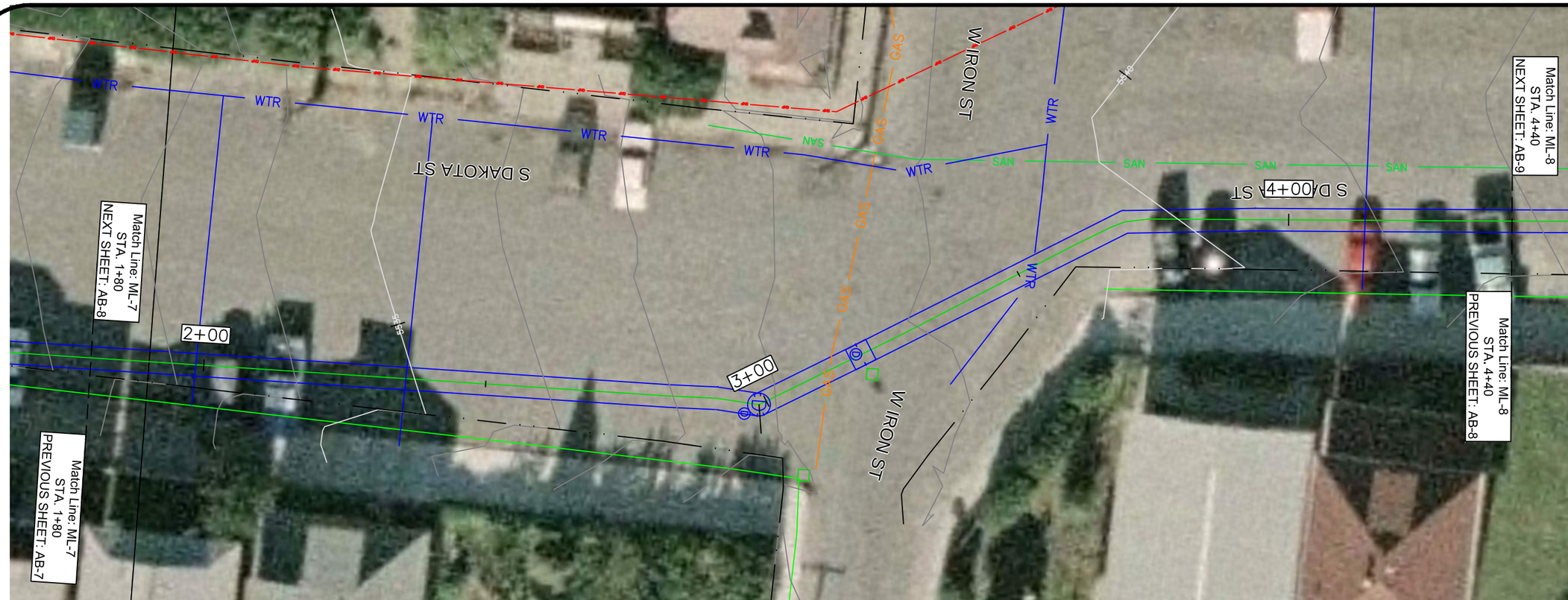
BGT AS-BUILT PLANS

STA: 115+40 - 1+80

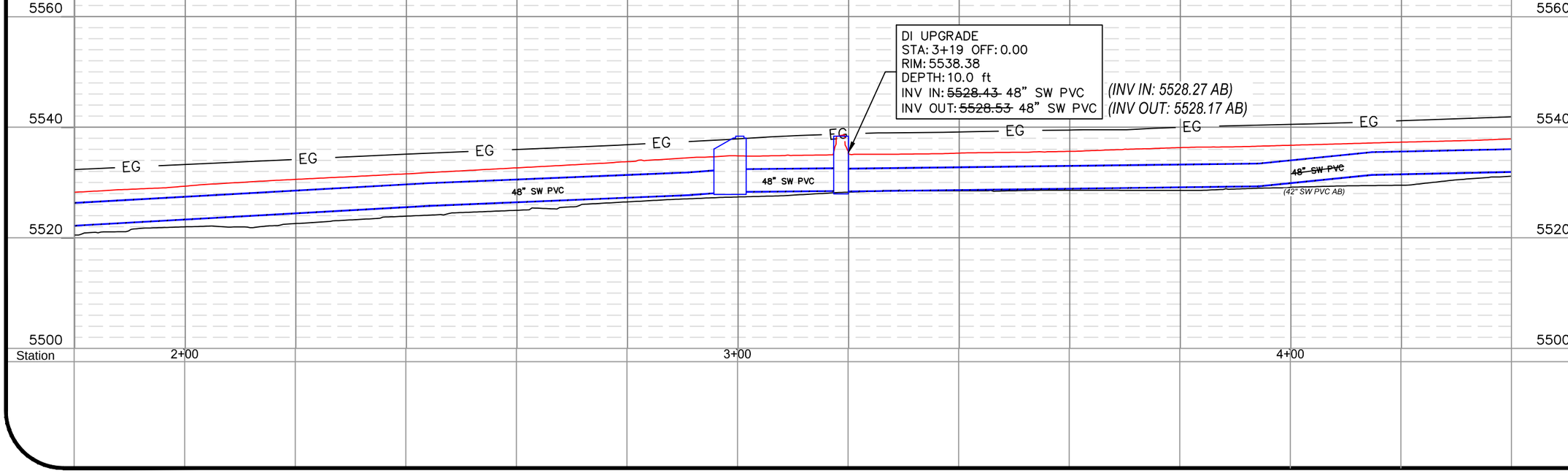
BUTTE, MT

SHEET
7 of 29

AB-7



BGT Tunnel Profile
Sta. 1+80 - 4+40
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



No.	Revision/Issue	Date

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SCALE 1" = 20'
0 10 20

JOB # B3BPWM36
DATE: 8/15/2012
DESIGNER: BAS
CHK'D BY: ####

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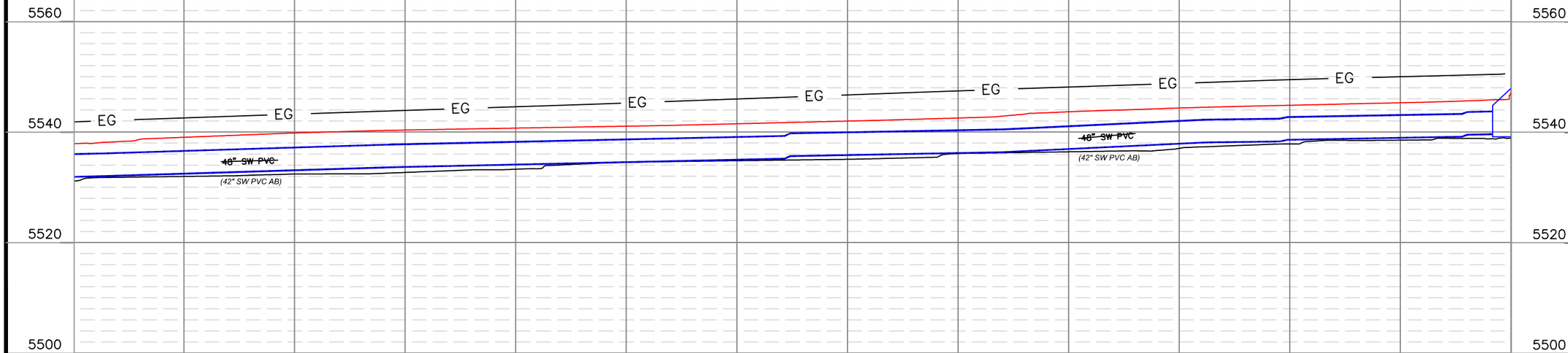
BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS
STA: 1+80 - 4+40
BUTTE, MT

SHEET
8 of 29

AB-8

BGT Tunnel Profile
Sta. 4+40 - 7+00
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 20'

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BGT REHABILITATION PROJECT - PHASE II

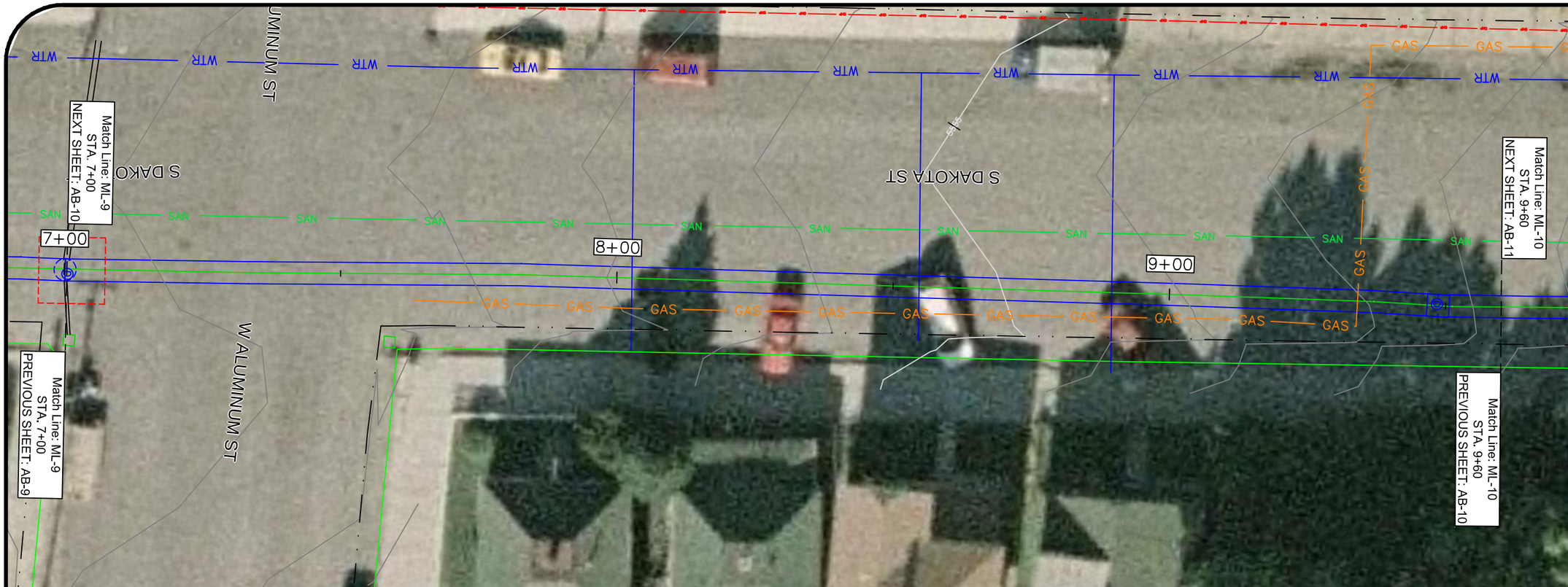
BGT AS-BUILT PLANS

STA. 4+40 - 7+00

BUTTE, MT

SHEET
9 of 29

AB-9



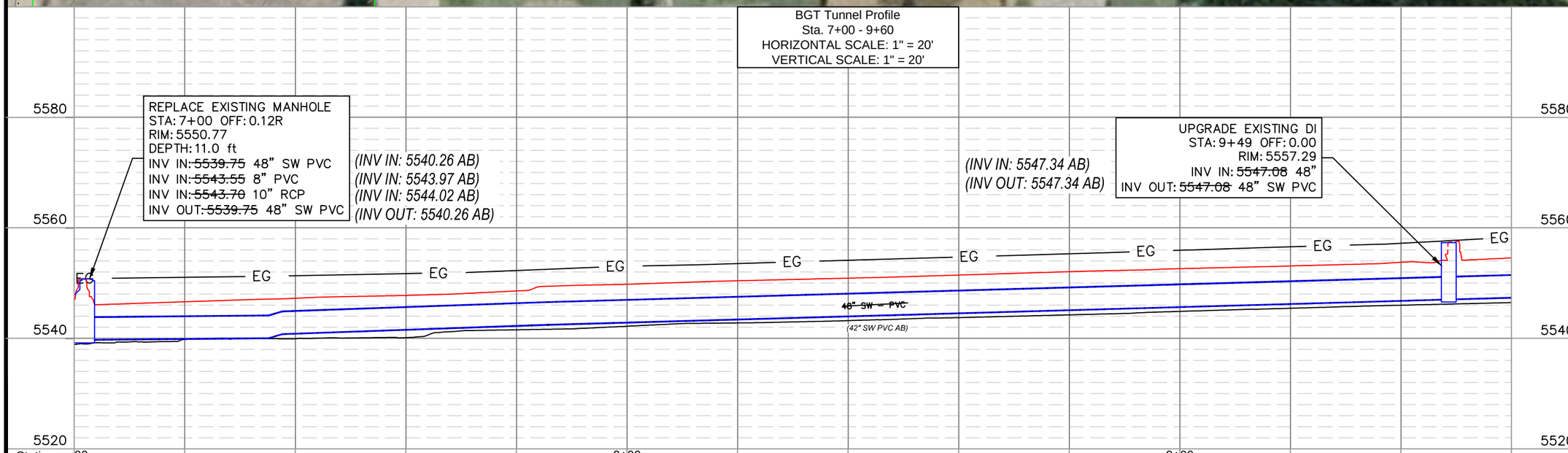
BGT Tunnel Profile
Sta. 7+00 - 9+60
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'

REPLACE EXISTING MANHOLE
STA: 7+00 OFF: 0.12R
RIM: 5550.77
DEPTH: 11.0 ft
INV IN: ~~5539.75~~ 48" SW PVC
INV IN: ~~5543.55~~ 8" PVC
INV IN: ~~5543.70~~ 10" RCP
INV OUT: ~~5539.75~~ 48" SW PVC

(INV IN: 5540.26 AB)
(INV IN: 5543.97 AB)
(INV IN: 5544.02 AB)
(INV OUT: 5540.26 AB)

(INV IN: 5547.34 AB)
(INV OUT: 5547.34 AB)

UPGRADE EXISTING DI
STA: 9+49 OFF: 0.00
RIM: 5557.29
INV IN: ~~5547.08~~ 48"
INV OUT: ~~5547.08~~ 48" SW PVC



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BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS

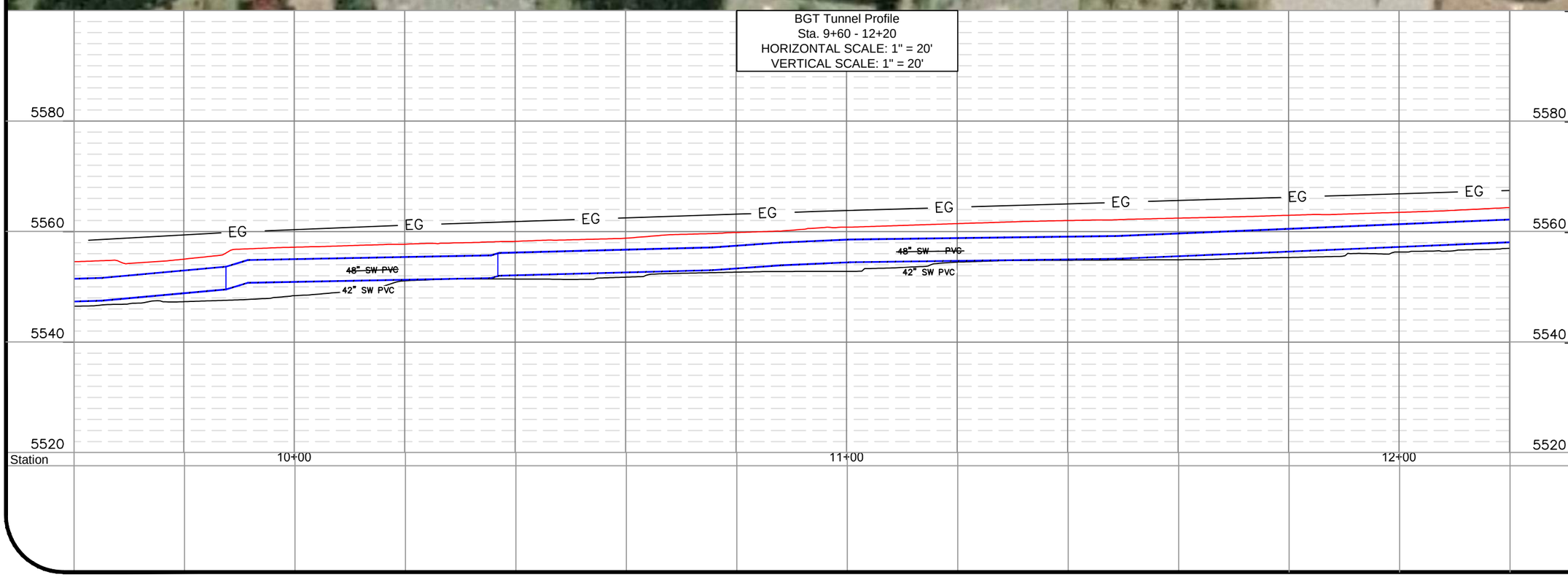
STA. 7+00 - 9+60

BUTTE, MT

SHEET
10 of 29

AB-10

BGT Tunnel Profile
Sta. 9+60 - 12+20
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 20'
0 10 20

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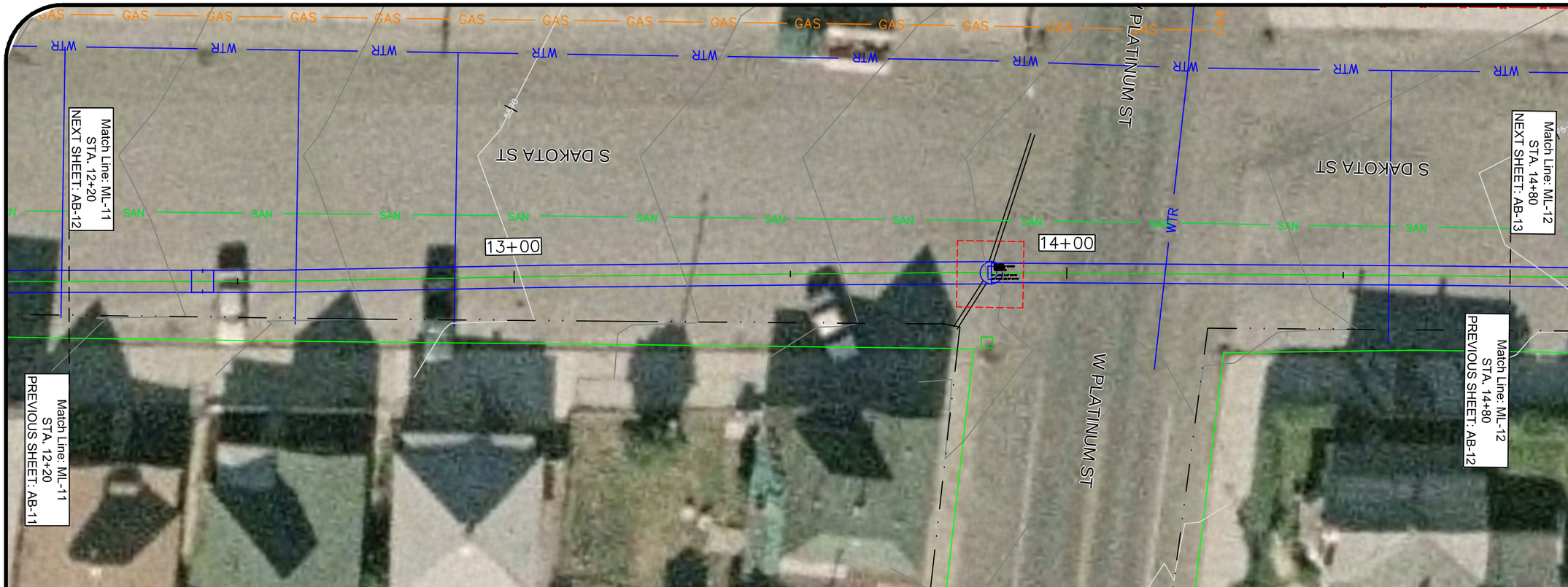
BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS

STA. 9+60 - 12+20

BUTTE, MT

SHEET
11 of 29

AB-11



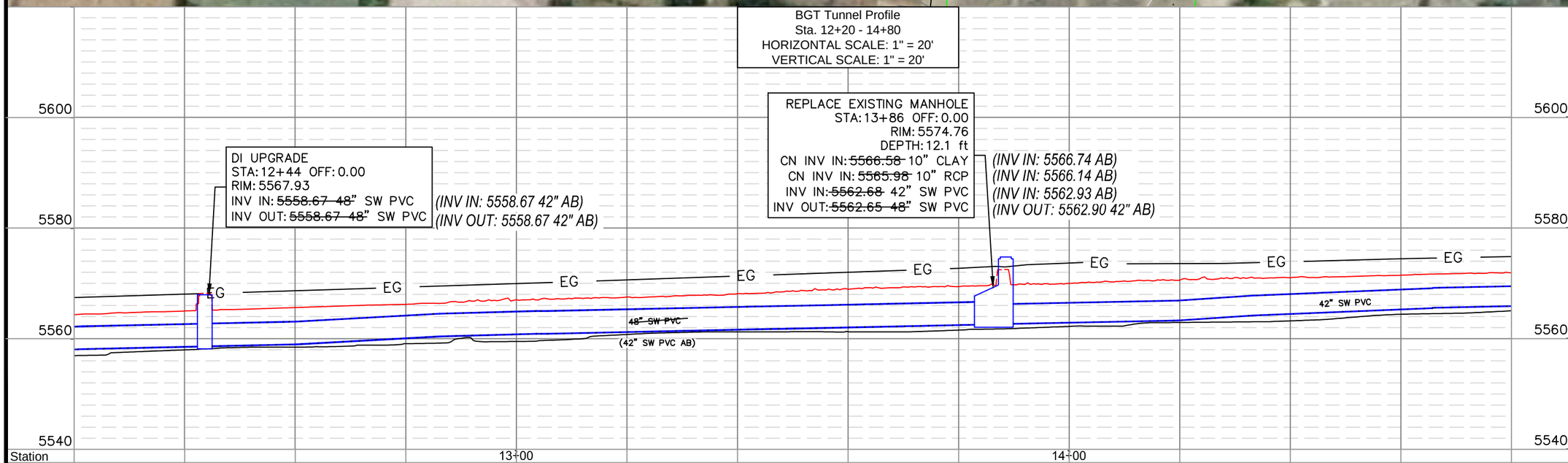
BGT Tunnel Profile
Sta. 12+20 - 14+80
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'

DI UPGRADE
STA: 12+44 OFF: 0.00
RIM: 5567.93
INV IN: ~~5558.67 48"~~ SW PVC
INV OUT: ~~5558.67 48"~~ SW PVC

(INV IN: 5558.67 42" AB)
(INV OUT: 5558.67 42" AB)

REPLACE EXISTING MANHOLE
STA: 13+86 OFF: 0.00
RIM: 5574.76
DEPTH: 12.1 ft
CN INV IN: ~~5566.58~~ 10" CLAY
CN INV IN: ~~5565.98~~ 10" RCP
INV IN: ~~5562.68~~ 42" SW PVC
INV OUT: ~~5562.65 48"~~ SW PVC

(INV IN: 5566.74 AB)
(INV IN: 5566.14 AB)
(INV IN: 5562.93 AB)
(INV OUT: 5562.90 42" AB)



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Suite 103
1321 8th Ave N.
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SCALE 1" = 20'

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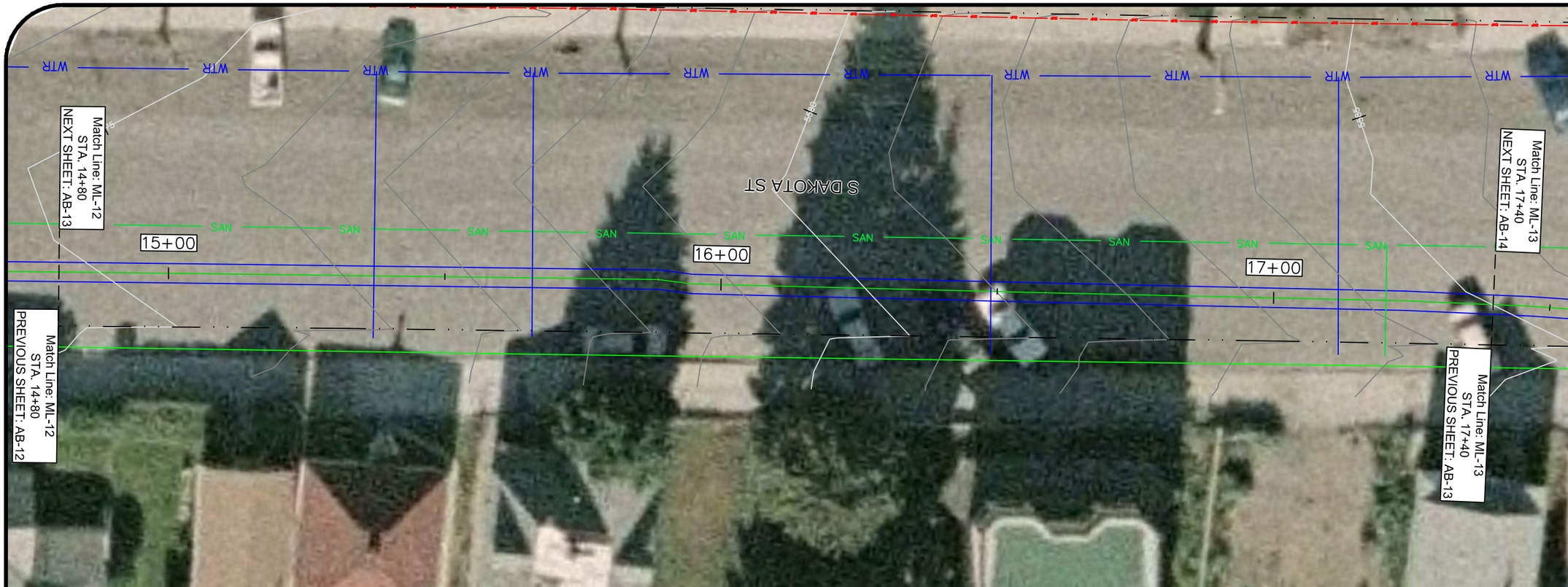
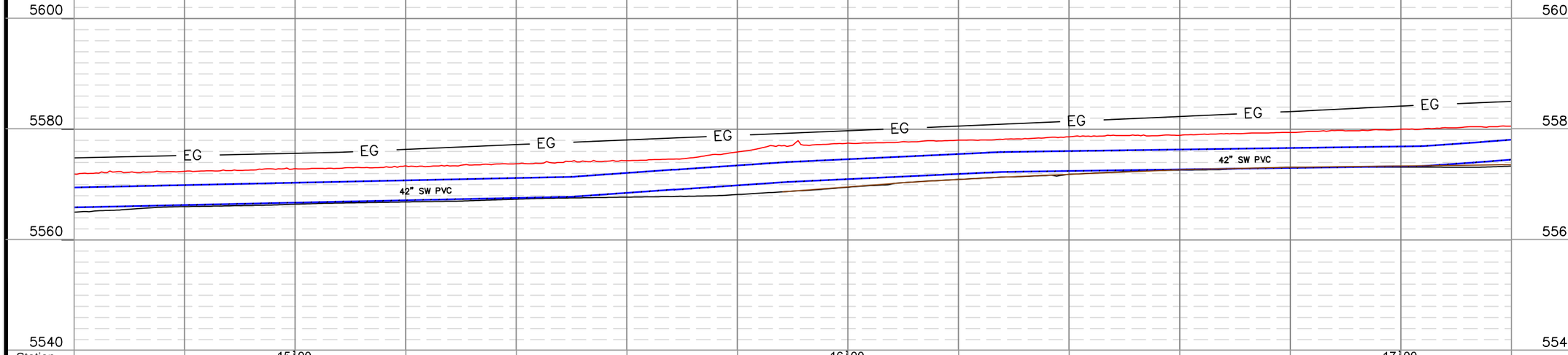
BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS
STA. 12+20 - 14+80
BUTTE, MT

SHEET
12 of 29

AB-12



BGT Tunnel Profile
Sta. 14+80 - 17+40
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



No.	Revision/Issue	Date

BUTTE-SILVER BOW
THE RICHEST HILL ON EARTH
5-2-77
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

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(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
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SCALE 1" = 20'
0 10 20

JOB # B3BPWM36
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BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS
STA. 14+80 - 17+40
BUTTE, MT

SHEET
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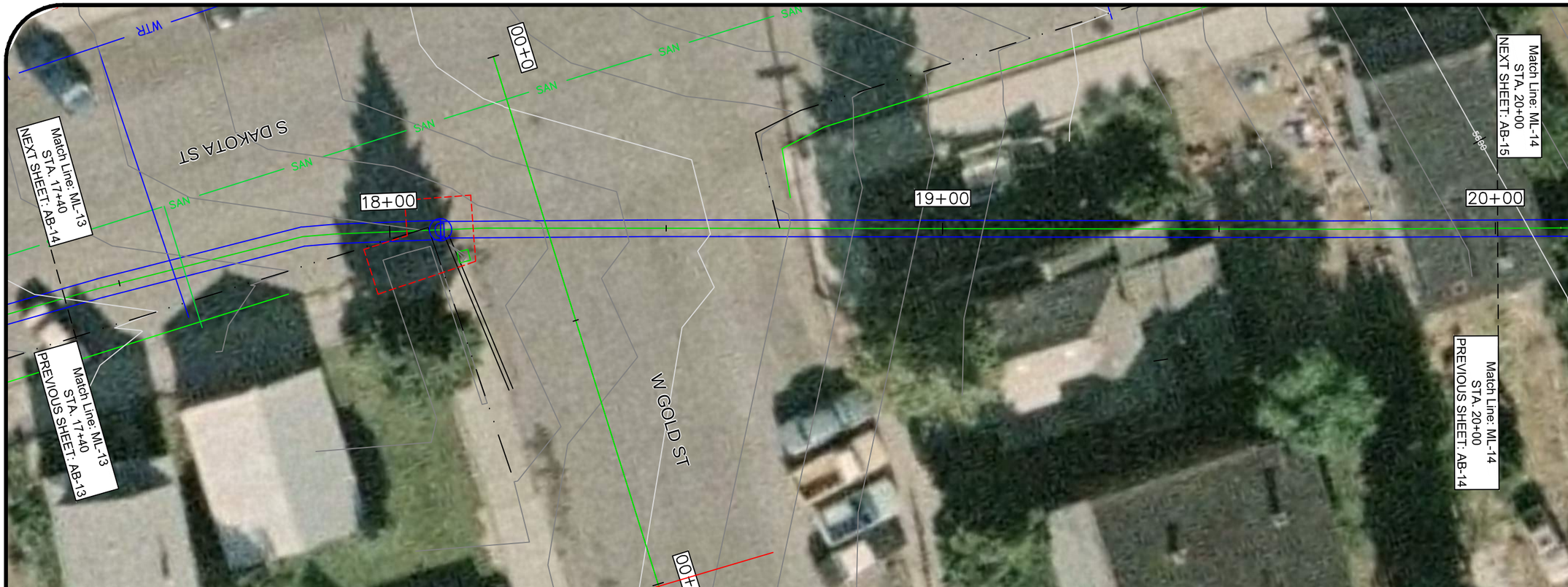
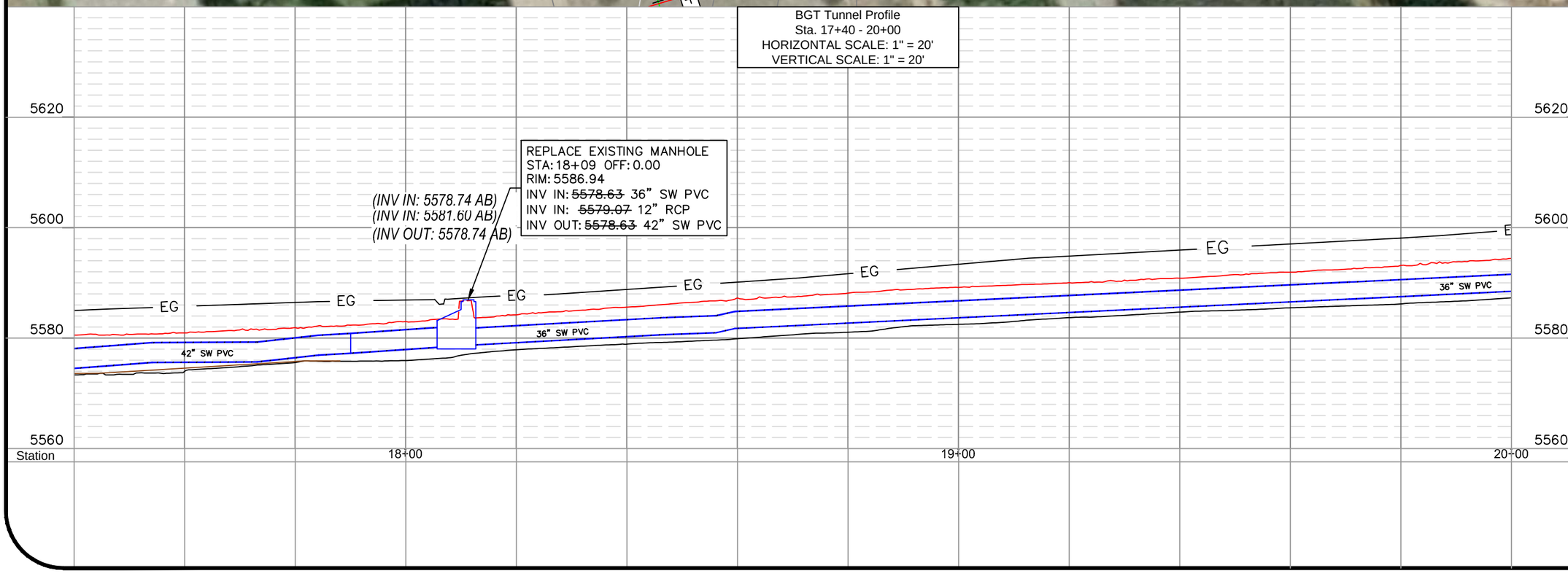
AB-13



BGT Tunnel Profile
Sta. 17+40 - 20+00
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT - PHASE II
BGT AS-BUILT PLANS
STA. 17+40 - 20+00
BUTTE, MT

SHEET
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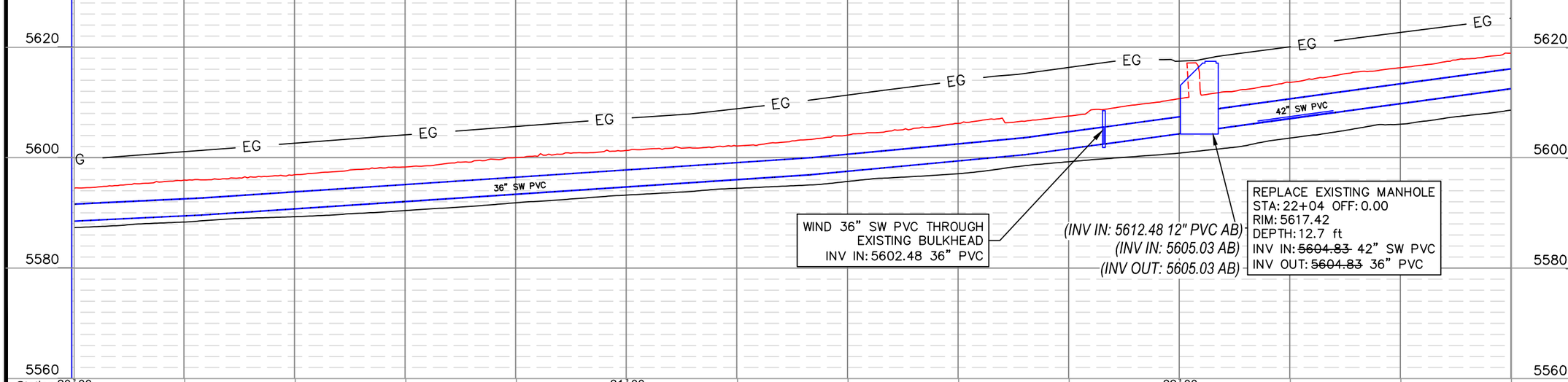
AB-14

BGT Tunnel Profile
Sta. 20+00 - 22+60
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 40'
0 40 80

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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS

STA. 20+00 - 22+60

BUTTE, MT

SHEET
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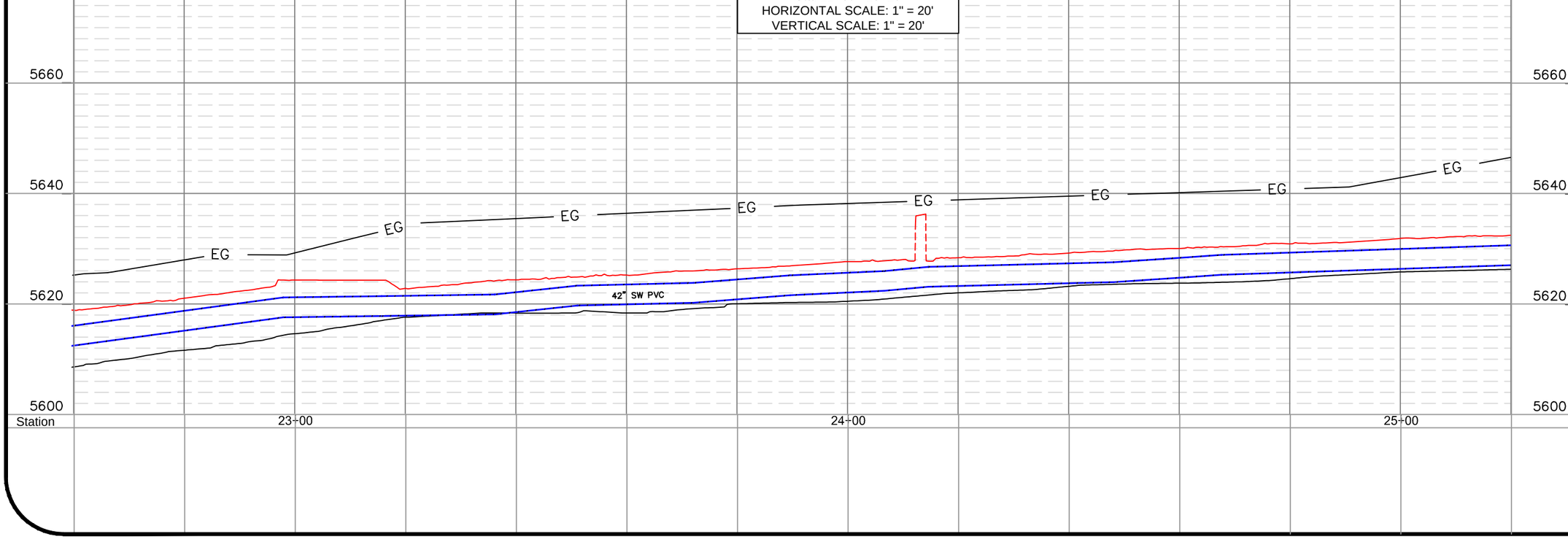
AB-15

BGT Tunnel Profile
Sta. 22+60 - 25+20
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 22+60 - 25+20
BUTTE, MT

SHEET
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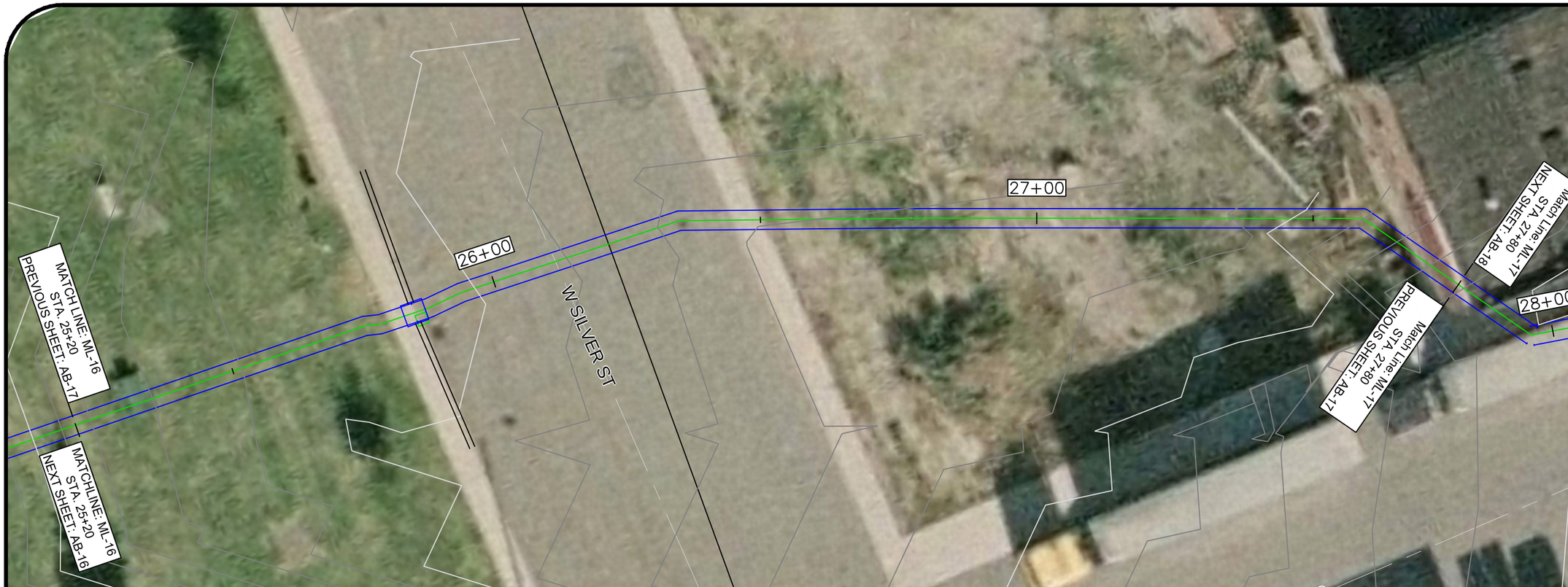
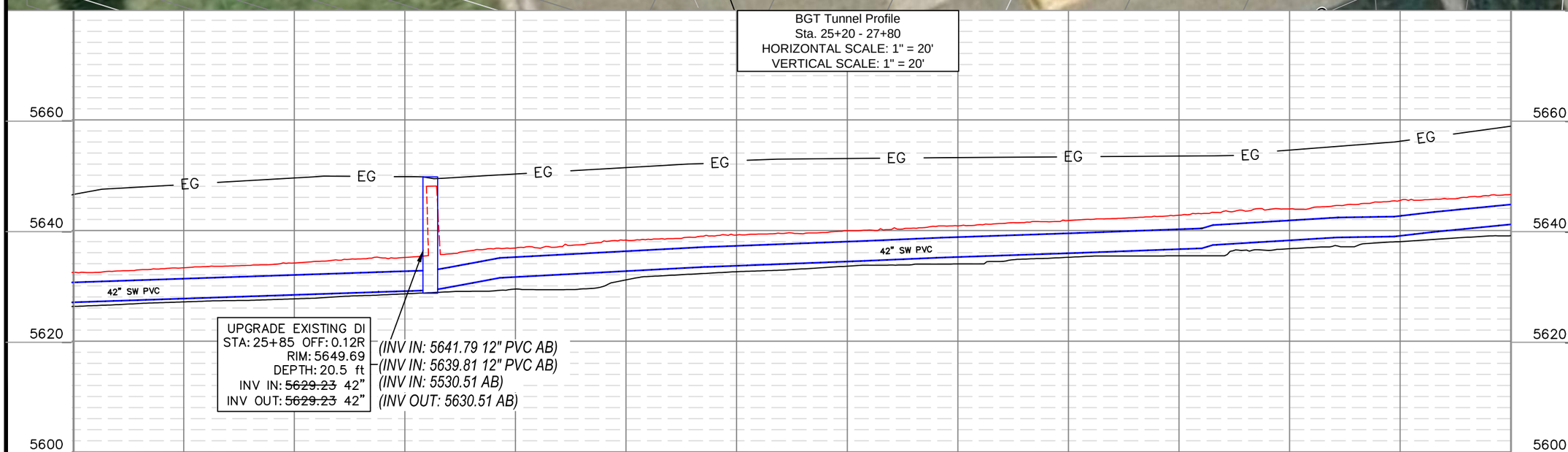


BGT Tunnel Profile
Sta. 25+20 - 27+80
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 25+20 - 27+80
BUTTE, MT

SHEET
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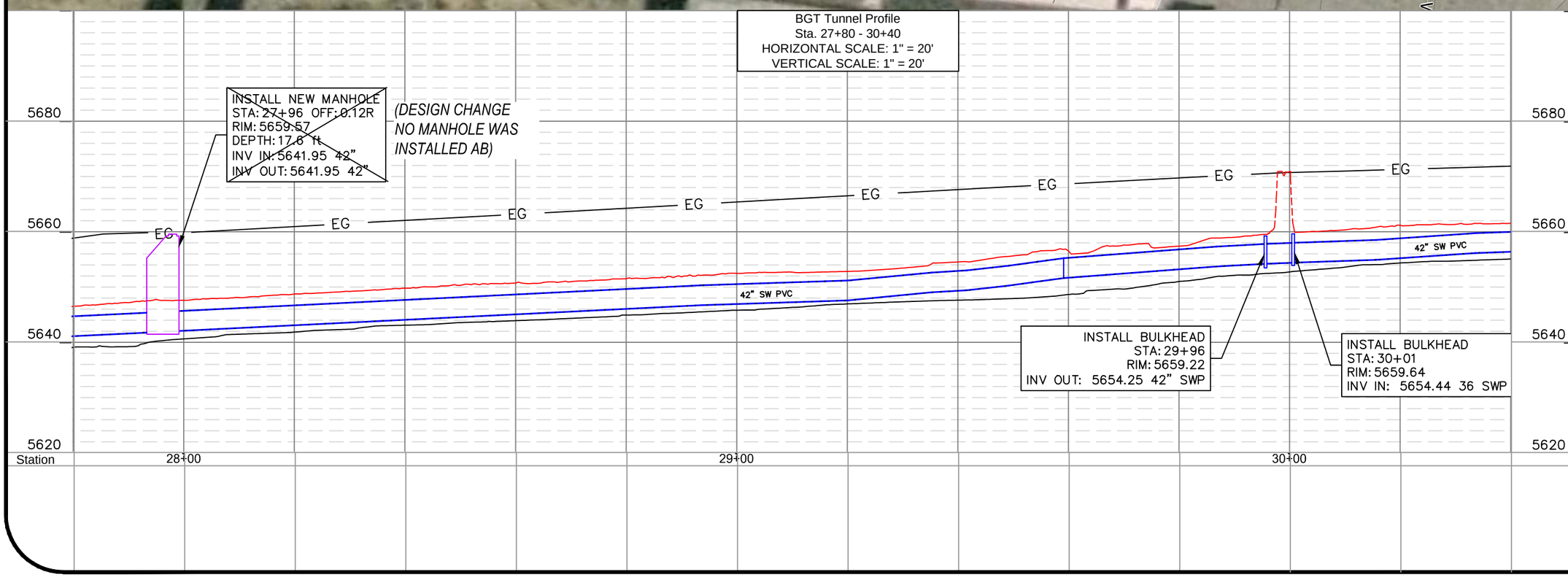
AB-17

BGT Tunnel Profile
Sta. 27+80 - 30+40
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 27+80 - 30+40
BUTTE, MT

SHEET
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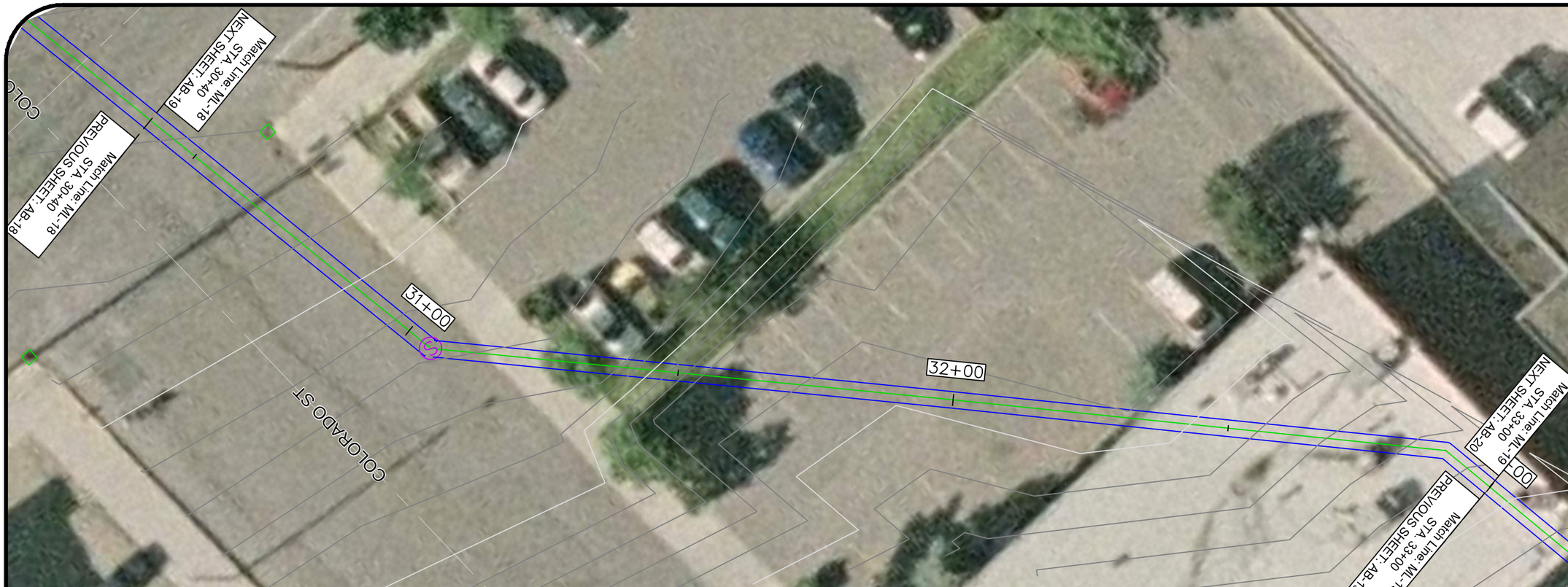
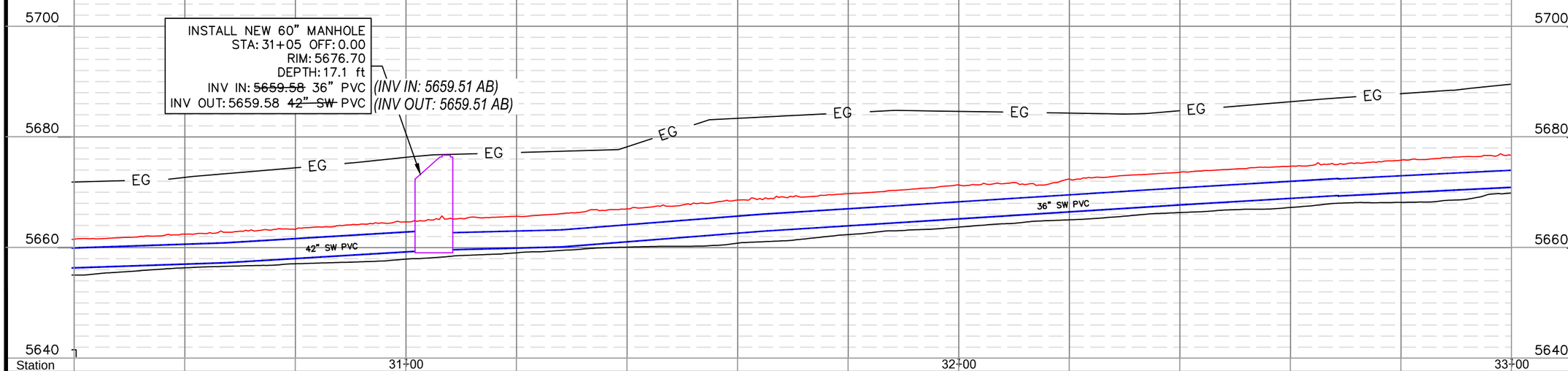


BGT Tunnel Profile
Sta. 30+40 - 33+00
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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0 40 80

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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 30+40 - 33+00
BUTTE, MT

SHEET
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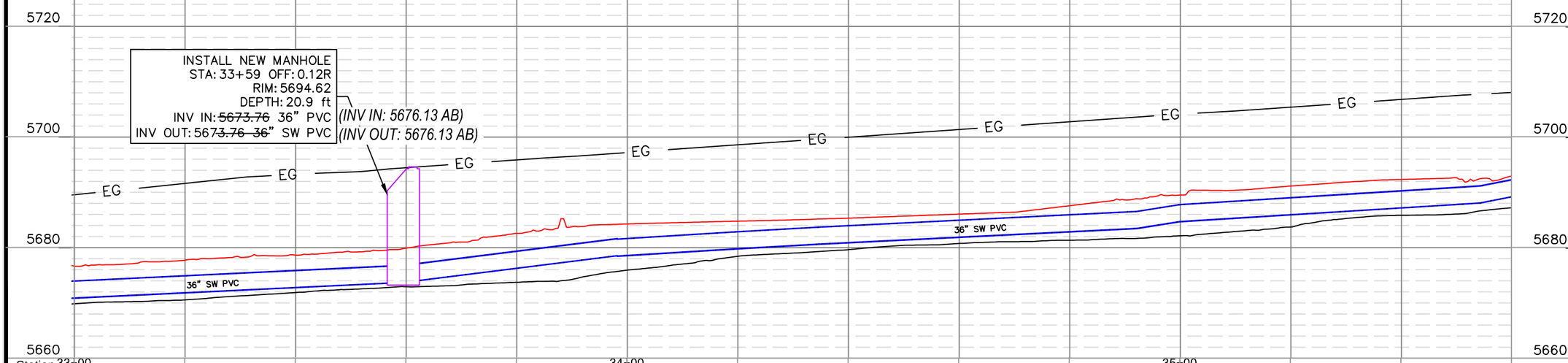
AB-19

BGT Tunnel Profile
Sta. 33+00 - 35+60
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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0 40 80

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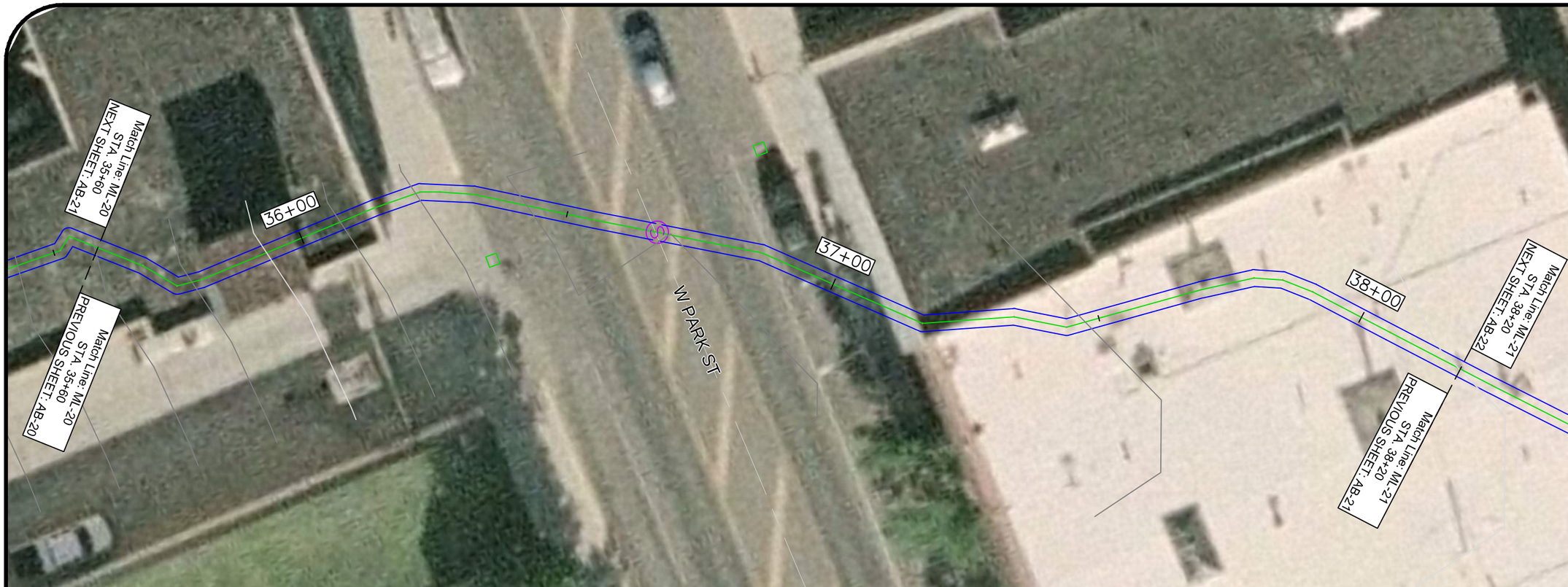
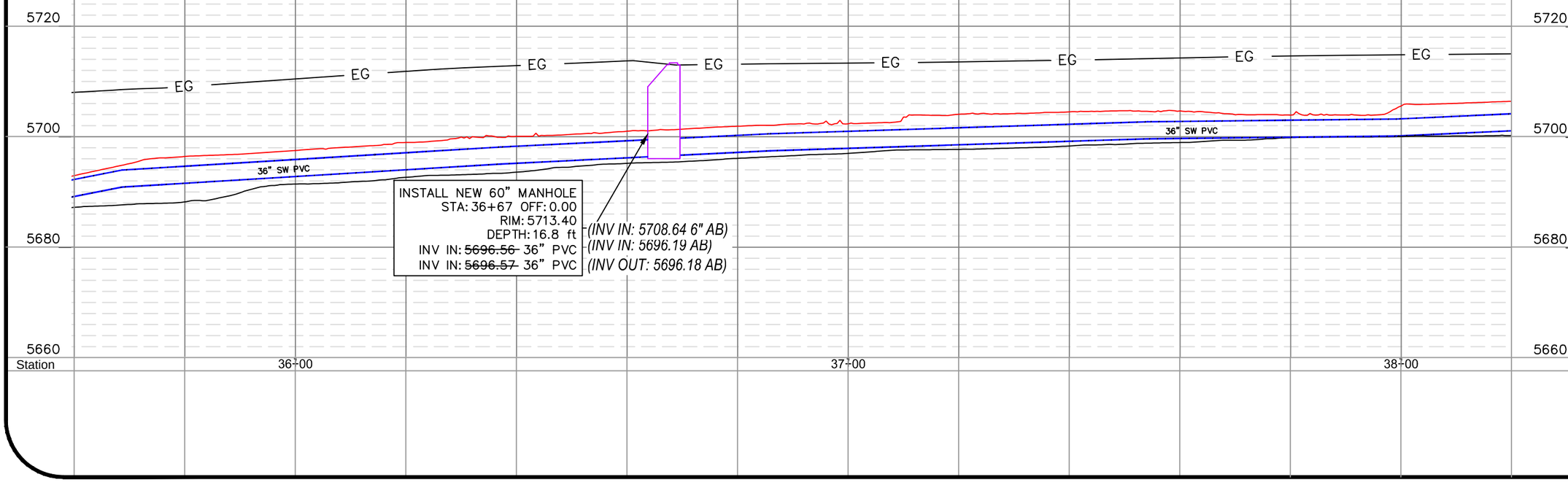
BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 33+00 - 35+60
BUTTE, MT

SHEET
20 of 29

AB-20



BGT Tunnel Profile
Sta. 35+60 - 38+20
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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SCALE 1" = 40'
0 40 80

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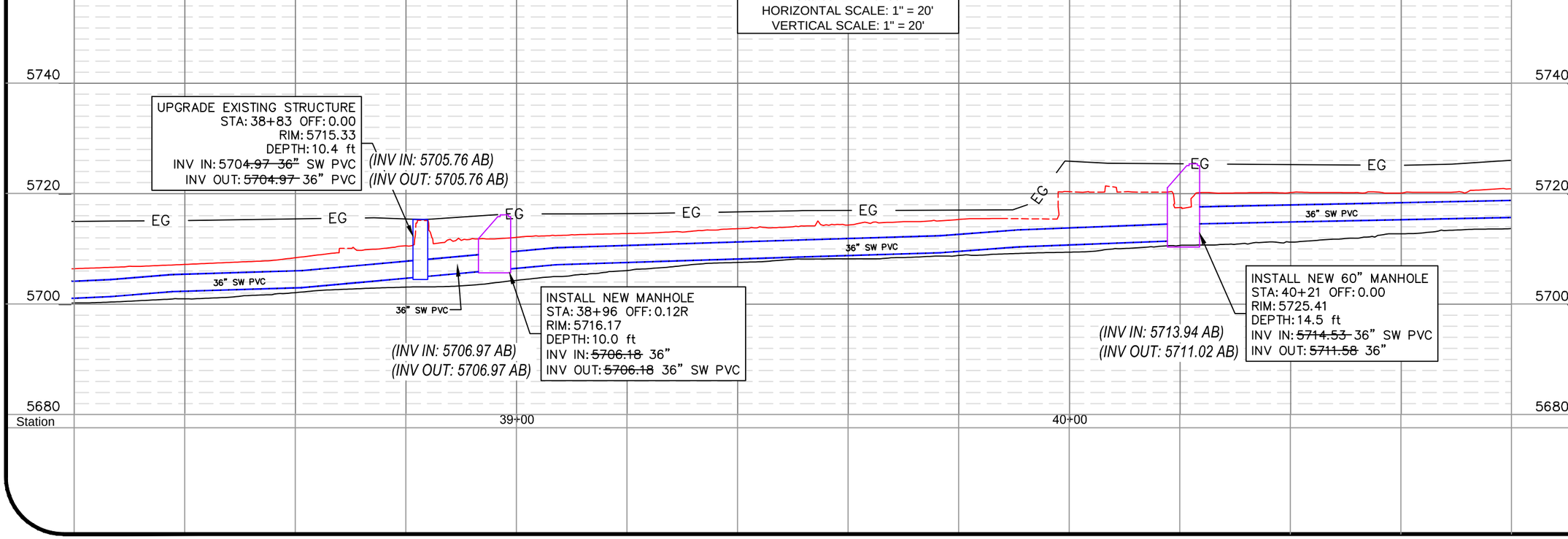
BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 35+60 - 38+20
BUTTE, MT

SHEET
21 of 29

AB-21

BGT Tunnel Profile
Sta. 38+20 - 40+80
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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0 40 80

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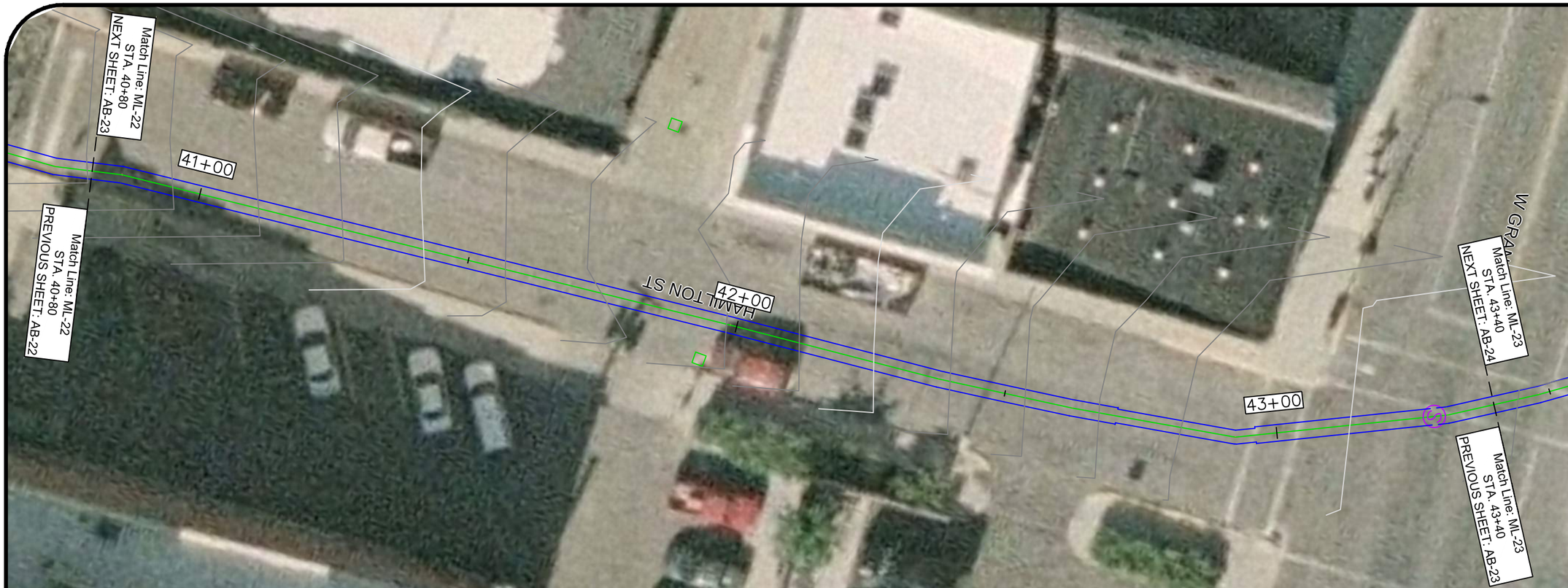
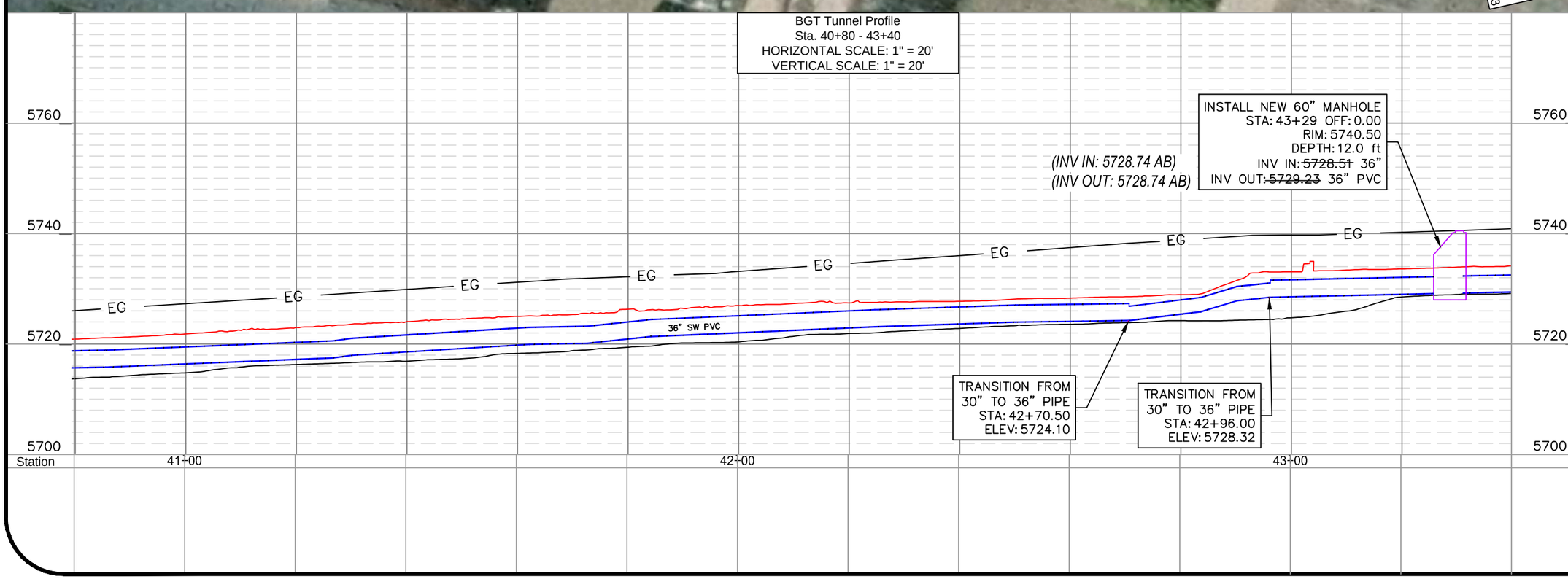
BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 38+20 - 40+80
BUTTE, MT

SHEET
22 of 29

AB-22



BGT Tunnel Profile
Sta. 40+80 - 43+40
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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0 40 80

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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS

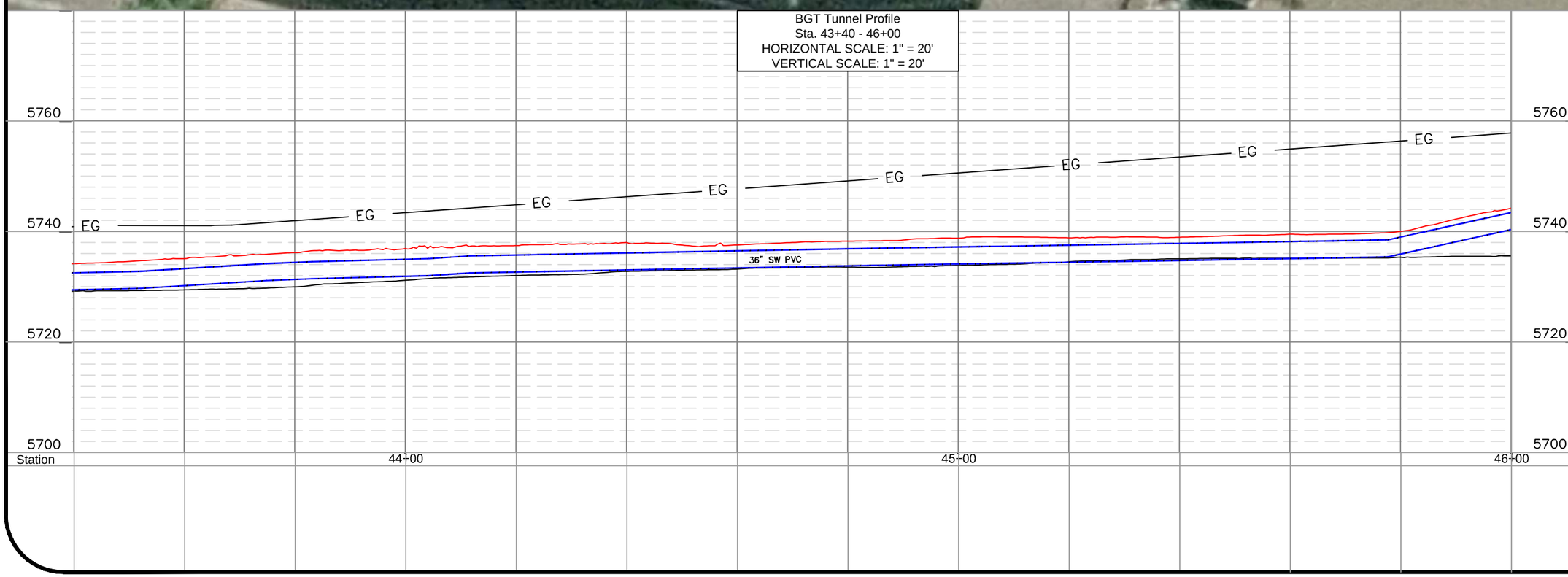
STA. 40+80 - 43+40

BUTTE, MT

SHEET
23 of 29

AB-23

BGT Tunnel Profile
Sta. 43+40 - 46+00
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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0 40 80

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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 43+40 - 46+00
BUTTE, MT

SHEET
24 of 29

AB-24

BGT Tunnel Profile
Sta. 46+00 - 48+60
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'

UPGRADE EXISTING STRUCTURE
TO DROP INLET
STA: 46+57 OFF: 0.00
RIM: 5759.50
DEPTH: 14.9 ft
INV IN: ~~5744.65~~ 36" PVC
INV OUT: ~~5744.65~~ 36"

(INV IN: 5744.97 AB)
(INV OUT: 5744.97 AB)

UPGRADE EXISTING STRUCTURE
TO DROP INLET
STA: 48+19 OFF: 0.00
RIM: 5772.52
DEPTH: 14.9 ft
INV IN: 5757.60 36" PVC
INV OUT: 5757.60 36" PVC

(DESIGN CHANGE DROP INLET WAS NOT UPGRADED AB)

INSTALL NEW MANHOLE
STA: 47+12 OFF: 0.12R
RIM: 5763.35
DEPTH: 14.6 ft
INV IN: ~~5748.77~~ 36" PVC
INV OUT: ~~5748.77~~ 36" PVC

(INV IN: 5759.11 6" PVC AB)
(INV IN: 5749.07 AB)
(INV OUT: 5749.07 AB)

EG

5780
5760
5740
5720

Station 46+00 47+00 48+00

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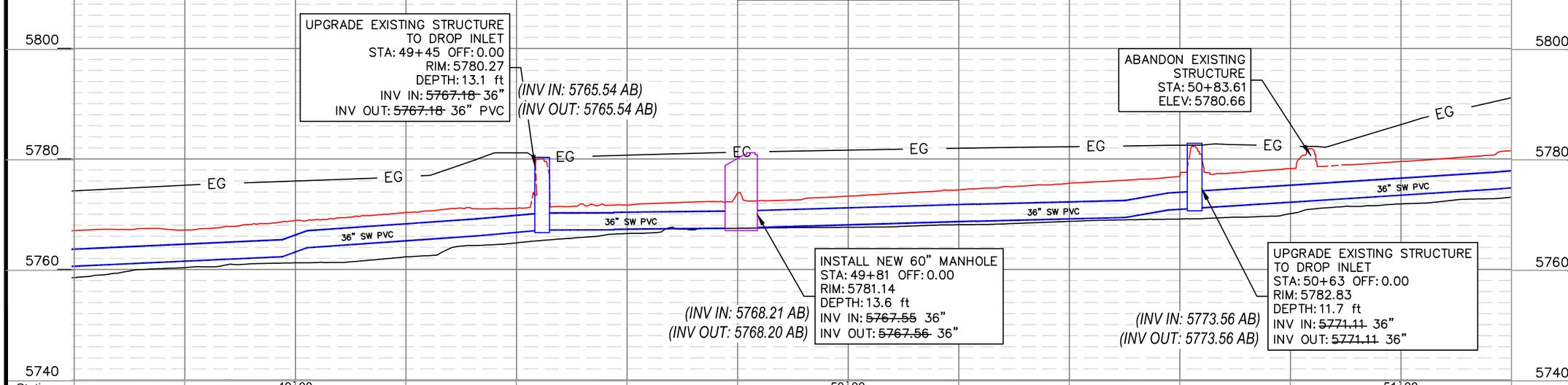
BGT AS-BUILT PLANS
STA. 46+00 - 48+60
BUTTE, MT

SHEET
25 of 29

AB-25

BGT Tunnel Profile
Sta. 48+60 - 51+20
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS

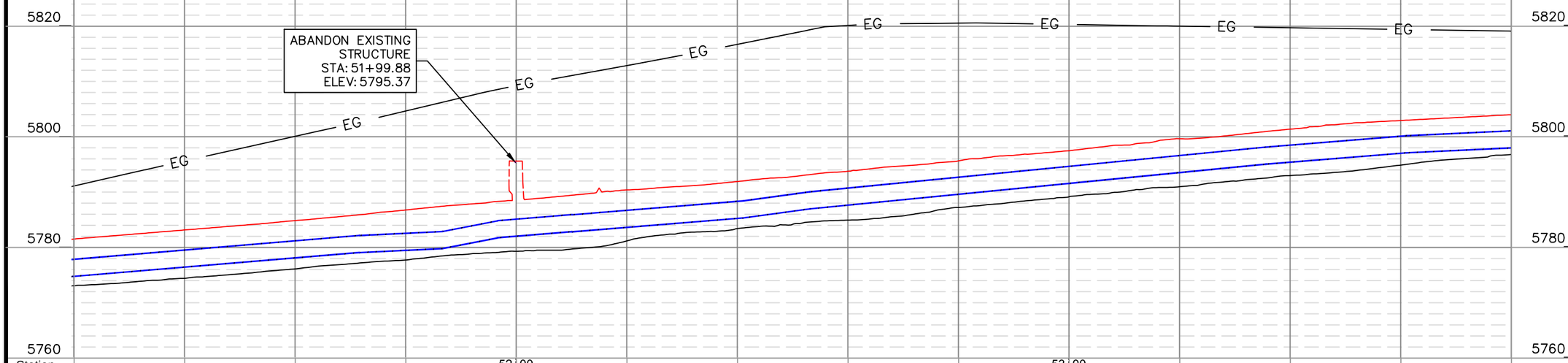
STA. 48+60 - 51+20

BUTTE, MT

SHEET
26 of 29

AB-26

BGT Tunnel Profile
Sta. 51+20 - 53+80
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS

STA. 51+20 - 53+80

BUTTE, MT

SHEET
27 of 29

AB-27

BGT Tunnel Profile
Sta. 53+80 - 55+40
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'

REPLACE WITH 60" MANHOLE
STA: 55+82 OFF: 0.00
RIM: 5824.41
DEPTH: 16.4 ft
INV IN: ~~5808.01~~ 36"
INV OUT: ~~5808.01~~ 36"

(INV IN: 5819.08 12" PVC AB)
(INV IN: 5809.07 AB)
(INV OUT: 5809.07 AB)

ABANDON EXISTING
STRUCTURE
STA: 55+35.39
ELEV: 5815.40

UPGRADE EXISTING STRUCTURE
TO DROP INLET
STA: 55+54 OFF: 0.00
RIM: 5823.88
DEPTH: 17.2 ft
INV IN: ~~5806.70~~ 36"
INV OUT: ~~5806.69~~ 36"

(INV IN: 5807.74 AB)
(INV OUT: 5807.73 AB)

EG

5840
5820
5800
5780

Station
54+00
55+00
56+00

No.	Revision/Issue	Date

BUTTE-SILVER BOW
5-2-77
THE RICHEST HILL ON EARTH
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Suite 200
480 E. Park Street
Butte, MT 59701
(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

SCALE 1" = 40'
0 40 80

JOB #: BSBPWM36
DATE: 6/25/2013
DRAFTER: AGM
CHK'D BY: ####

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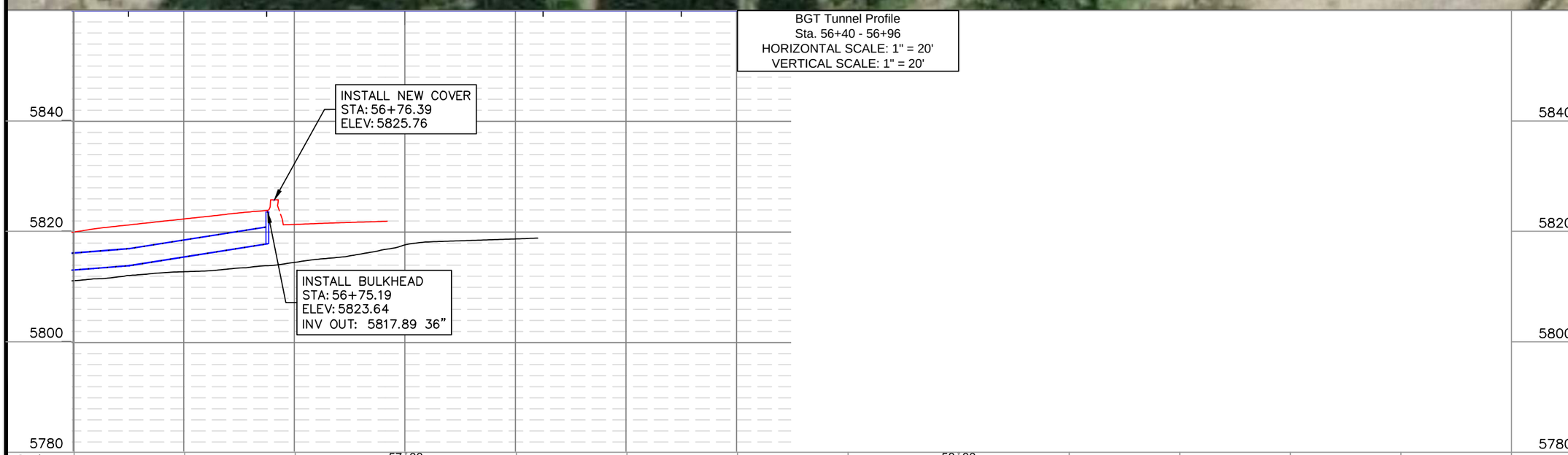
BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 53+80 - 55+40
BUTTE, MT

SHEET
28 of 29

AB-28

BGT Tunnel Profile
Sta. 56+40 - 56+96
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 20'



No.	Revision/Issue	Date

BUTTE-SILVER BOW
THE RICHEST HILL ON EARTH
5-2-77
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Suite 200
480 E. Park Street
Butte, MT 59701
(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

SCALE 1" = 40'
0 40 80

JOB # B3BPWM36
DATE: 6/25/2013
DRAFTER: AGM
CHK'D BY: ###

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BGT REHABILITATION PROJECT
BGT AS-BUILT PLANS
STA. 56+40 - 56+96
BUTTE, MT

SHEET
29 of 29

AB-29

BUTTE PRIORITY SOILS OPERABLE UNIT
THIRD CYCLE STORM WATER BMP'S
CONTINENTAL ROADSIDE CHANNEL

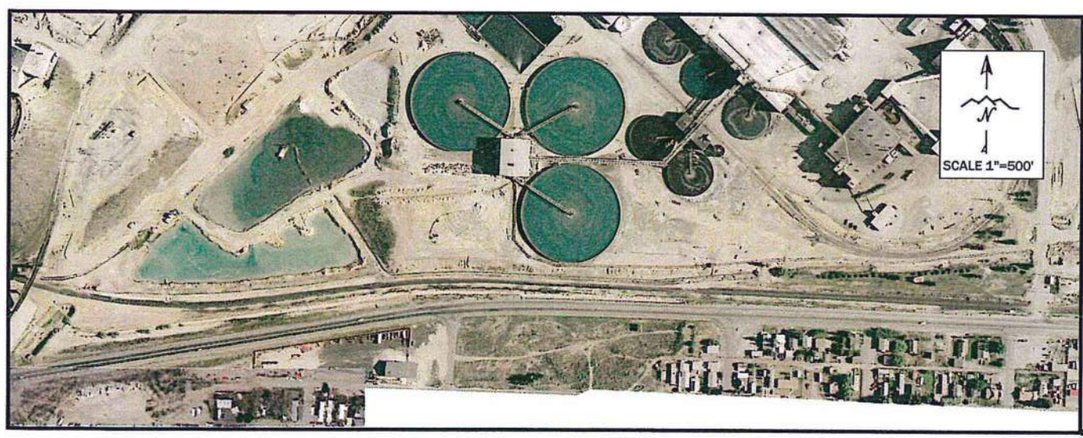
PREPARED FOR

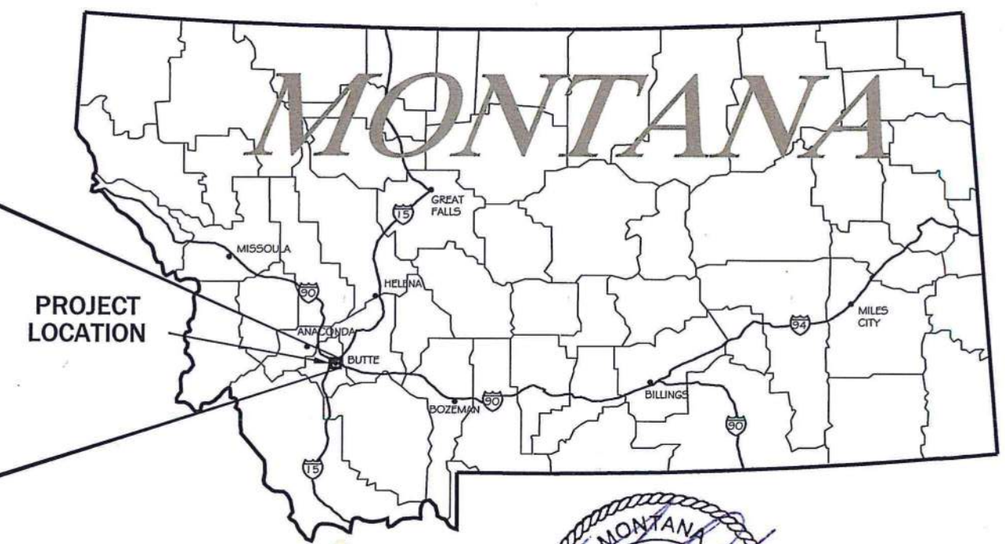
ATLANTIC RICHFIELD COMPANY

PREPARED BY

PIONEER TECHNICAL SERVICES, INC.

MAY 2014





MONTANA
LEONARD J DUECK
16812PE
LICENSED
PROFESSIONAL ENGINEER

SITE VICINITY MAP

SOURCE: 2004 HORIZON

SHEET
1

LEGEND

EXISTING - PLAN VIEW

- 7700 — INDEX CONTOURS
- INTERMEDIATE CONTOURS
- CULVERT
- EXISTING ROAD
- RAILROAD TRACKS
- CLEARWATER CHANNEL
- PROPERTY LINE
- OE — ELECTRICAL LINE
- GAS — GAS LINE
- SD — STORM DRAIN
- WTR — WATER LINE
- SD — STORM INLET
- POWER POLE
- GUY WIRE
- S — SANITARY SEWER MANHOLE
- EXISTING FENCE
- WV — EXISTING WATER VALVE
- EXISTING FIRE HYDRANT
- ROCK
- EXISTING LIGHT POLE

PROPOSED - PLAN VIEW

- 7700 — INDEX CONTOURS
- INTERMEDIATE CONTOURS
- 2400 — 100 FT. STATIONING
- 2% — GRADE OR SURFACE SLOPE (PERCENT)
- PROPOSED ROAD
- OE — OVERHEAD ELECTRICAL LINE
- UE — UNDERGROUND ELECTRICAL LINE
- X — FENCE
- D — STORM MANHOLE
- PROPOSED STORM MAIN
- GRADING LIMIT

- CENTERLINE
- ℄ CENTERLINE
- SLOPE DESIGNATION (ARROWS POINT DOWN SLOPE)
- 1:3 SLOPE DESIGNATION

SHEET INDEX

1 COVER SHEET
2 INDEX AND LEGEND
3 OVERALL PLAN VIEW
4 GRADING ALIGNMENTS
5 GRADING ALIGNMENTS
6 GRADING ALIGNMENTS
7 SOUTH CHANNEL PLAN AND PROFILE STA 0+00 TO 6+50
8 SOUTH CHANNEL PLAN AND PROFILE STA 6+50 TO 13+00
9 SOUTH CHANNEL PLAN AND PROFILE STA 13+00 TO 19+50
10 SOUTH CHANNEL PLAN AND PROFILE STA 19+50 TO 26+00
11 SOUTH CHANNEL PLAN AND PROFILE STA 26+00 TO 32+61
12 SOUTH CHANNEL CROSS SECTIONS STA 0+00 TO 3+50
13 SOUTH CHANNEL CROSS SECTIONS STA 4+00 TO 10+50
14 SOUTH CHANNEL CROSS SECTIONS STA 11+00 TO 20+50
15 SOUTH CHANNEL CROSS SECTIONS STA 21+00 TO 32+25
16 SOUTH CHANNEL VOLUME TABLE
17 NORTHWEST CHANNEL PLAN AND PROFILE STA 0+00 TO 6+50
18 NORTHWEST CHANNEL PLAN AND PROFILE STA 6+50 TO 13+00
19 NORTHWEST CHANNEL PLAN AND PROFILE STA 13+00 TO 19+50
20 NORTHWEST CHANNEL PLAN AND PROFILE STA 19+50 TO 20+78
21 NORTHWEST CHANNEL CROSS SECTIONS STA 0+00 TO 20+50
22 NORTHWEST CHANNEL VOLUME TABLE
23 NORTHEAST CHANNEL PLAN AND PROFILE STA 0+00 TO 6+50
24 NORTHEAST CHANNEL PLAN AND PROFILE STA 6+50 TO11+93
25 NORTHEAST CHANNEL CROSS SECTIONS STA 0+00 TO 11+50
26 NORTHEAST CHANNEL VOLUME TABLE
27 HDPE PIPING PLAN AND PROFILE STA 0+00 TO 6+50
28 HDPE PIPING PLAN AND PROFILE STA 6+50 TO 13+00
29 HDPE PIPING PLAN AND PROFILE STA 13+00 TO 20+65
30 SITE CROSS SECTIONS STA 0+00 TO 5+00
31 SITE CROSS SECTIONS STA 6+00 TO 11+00
32 SITE CROSS SECTIONS STA 12+00 TO 18+00
33 SITE CROSS SECTIONS STA 19+00 TO 25+00
34 SITE CROSS SECTIONS STA 26+00 TO 33+00
35 TOTAL EXCAVATION VOLUME TABLE
36 TOTAL BACKFILL VOLUME TABLE
37 COMBINATION CHANNEL DETAIL
38 CHANNEL DETAILS
39 FENCE DETAIL

DETAIL INDICATOR

1/7 — DETAIL NUMBER; SHEET NUMBER ON WHICH DETAIL APPEARS

ON PLAN

DETAIL 1/7 — DETAIL NUMBER; SHEET NUMBER ON WHICH DETAIL IS REFERENCED.

AT DETAIL

SECTION INDICATOR

1/1 — SECTION DESIGNATION; SHEET NUMBER ON WHICH SECTION APPEARS

ON PLAN

SECTION 1/7 — SECTION DESIGNATION; SHEET NUMBER ON WHICH SECTION IS REFERENCED.

AT SECTION

PROFILE ELEVATIONS

6062.3 / 6061.00 — 1+00

EXISTING GROUND ELEVATION (AS SPECIFIED ON PROFILE)

FINISHED GROUND ELEVATION (AS SPECIFIED ON PROFILE)

NOTES:
ON PLANS: "–" SYMBOL IN UPPER HALF OF BUBBLE INDICATES GENERAL REFERENCE TO NOTED DRAWING NUMBER.
AT DETAIL/SECTIONS: "–" SYMBOL (NO DRAWING NUMBER) IN LOWER HALF OF BUBBLE INDICATES DETAIL/SECTION IS REFERENCED ON MORE THAN ONE DRAWING.

REVISION:
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LJD
CHECKED BY: MCB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE: PIONEER

SCALE IN FEET
0 NTS

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

INDEX AND LEGEND

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 2

REVISION: DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY:
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

SCALE IN FEET
0 150 300

THIRD CYCLE STORM WATER
BMP'S
CONT ROADSIDE CHANNEL

OVERALL
PLAN
VIEW

PIONEER
TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
3

2/28/2014 9:37:44 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-PLN-001-13.DWG

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY:
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS/AES/NAIP

N

SCALE IN FEET
0 50 100

THIRD CYCLE STORM WATER
BMP'S
CONT ROADSIDE CHANNEL

GRADING
ALIGNMENTS

PIONEER
TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
4

5/15/2014 5:20:02 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-PLN-002-13.DWG

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS/AES/NAIP

N

SCALE IN FEET
0 50 100

THIRD CYCLE STORM WATER BMPS
CONT ROADSIDE CHANNEL

GRADING ALIGNMENTS

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
5

5/15/2014 5:24:41 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-PLN-003-13.DWG

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MCB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS/AES/NAIP

N

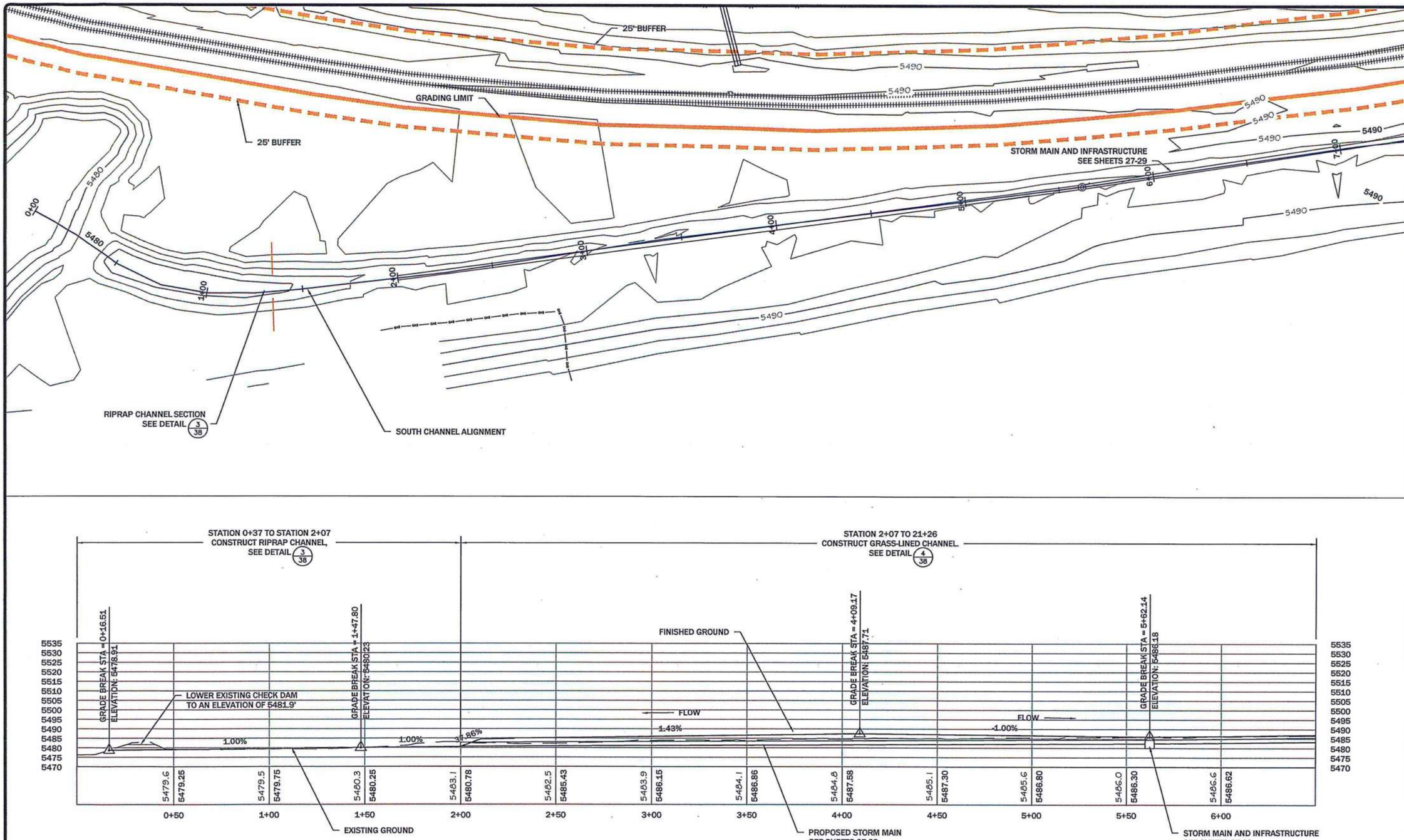
SCALE IN FEET
0 50 100

THIRD CYCLE STORM WATER
BMP'S
CONT ROADSIDE CHANNEL

GRADING
ALIGNMENTS

PIONEER
TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
6



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION: DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

N

SCALE IN FEET
0 25 50

THIED CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CHANNEL PLAN AND PROFILE STA 0+00 TO 6+50

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 7

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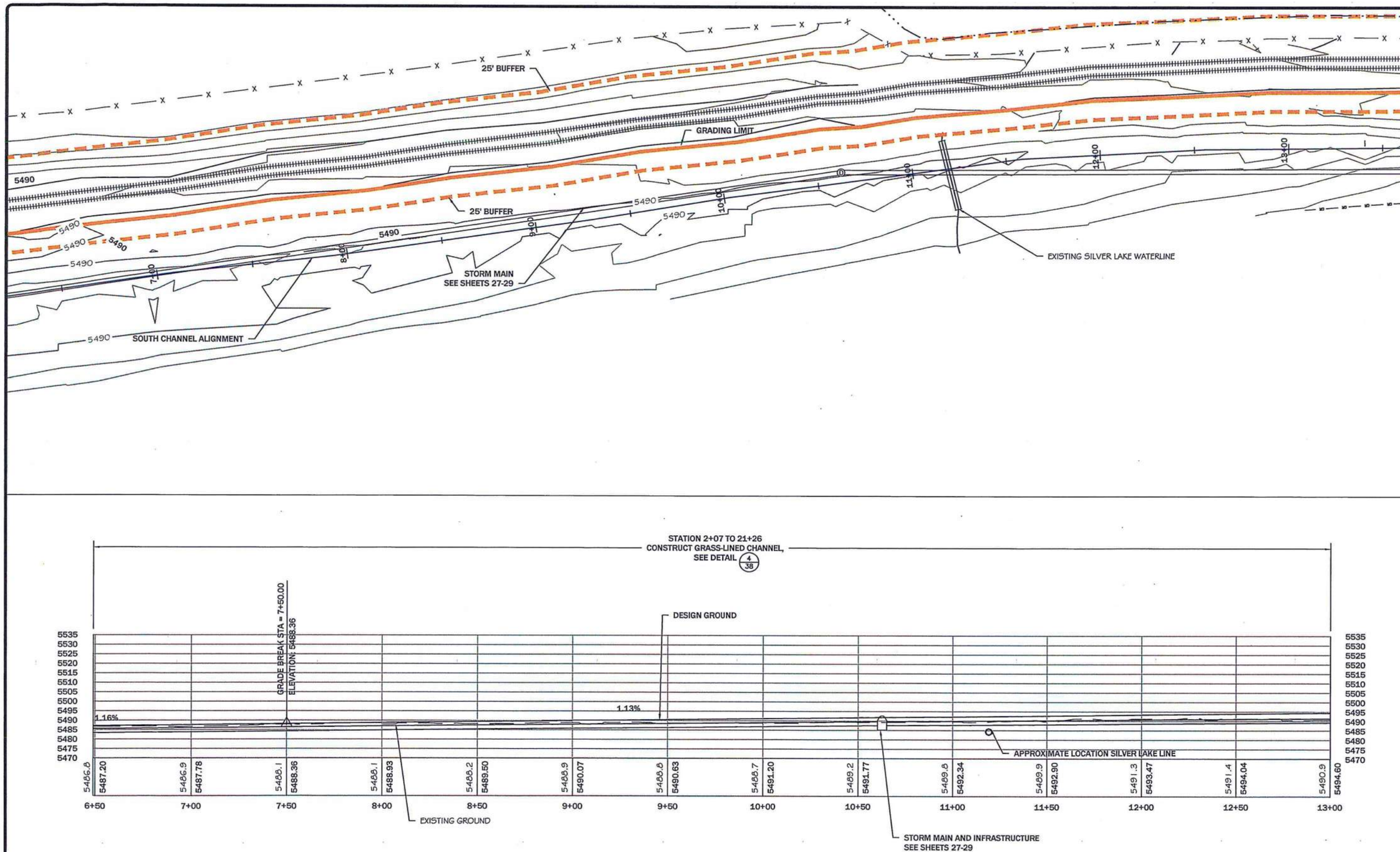

NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

N

SCALE IN FEET
0 25 50

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CHANNEL
PLAN AND PROFILE
STA 6+00 TO 13+00

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
8

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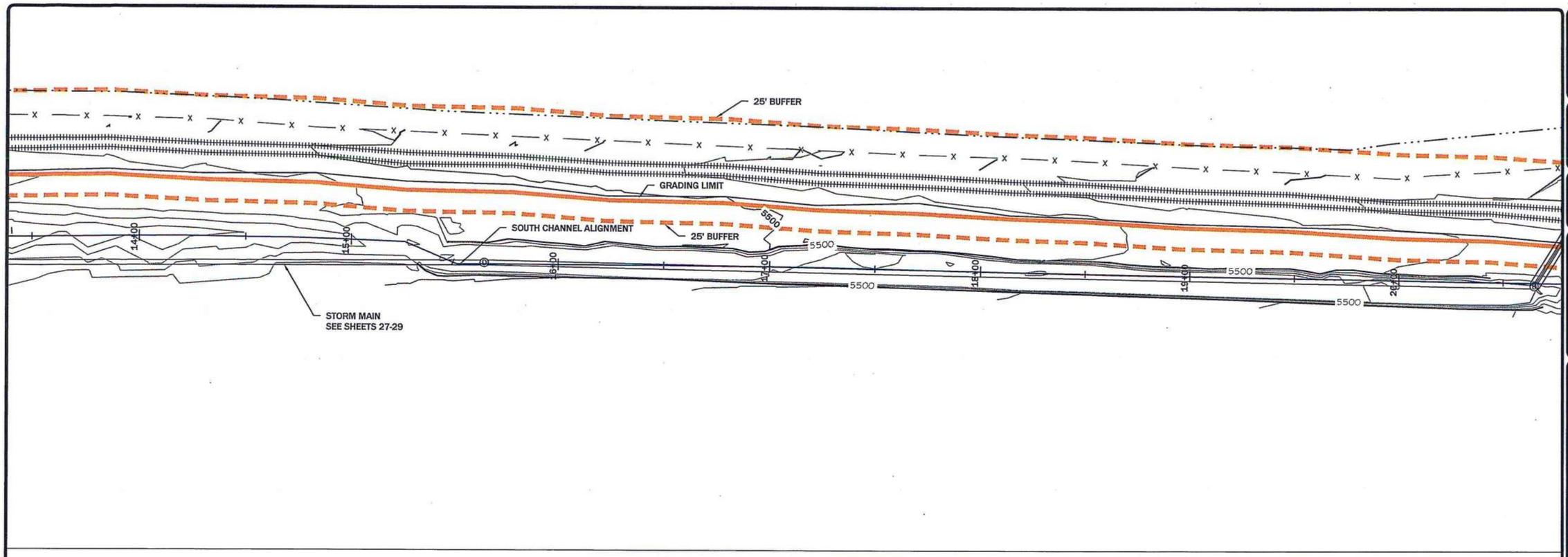
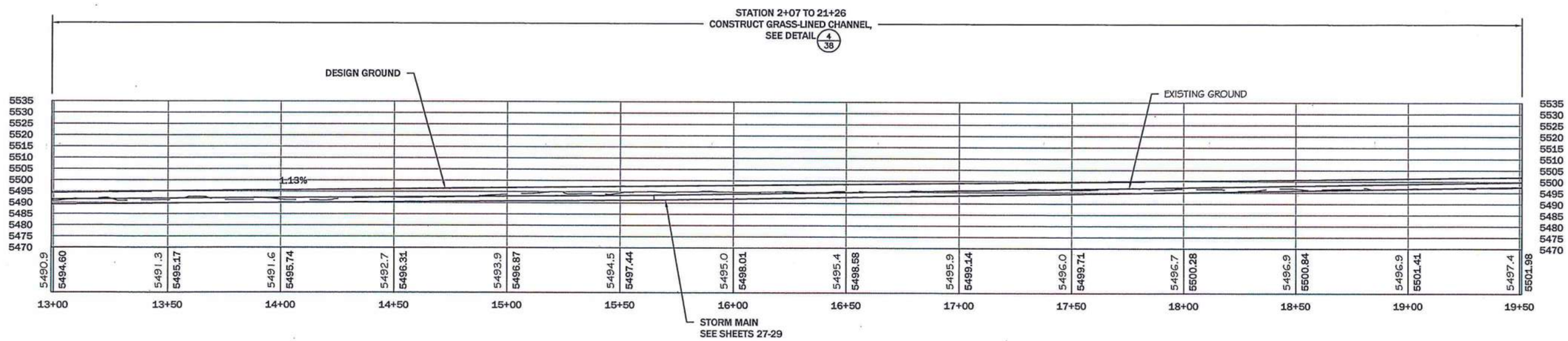




NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

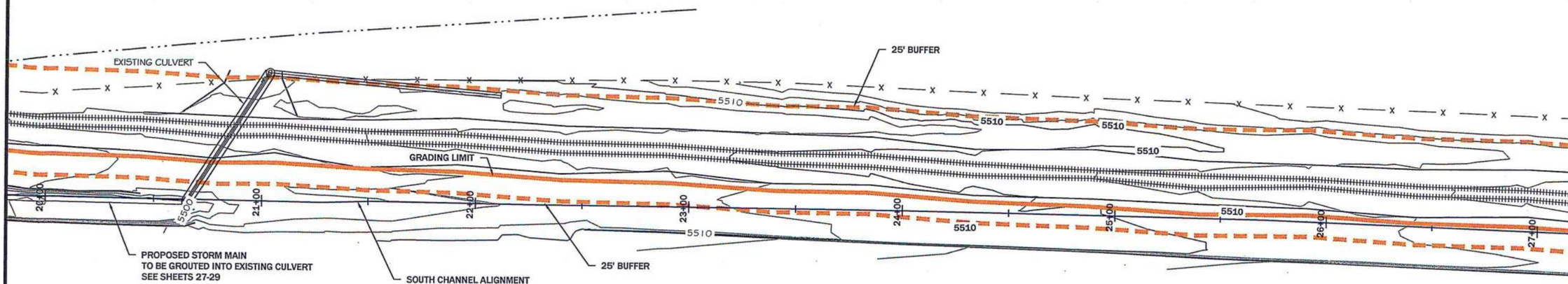
SCALE IN FEET
0 25 50

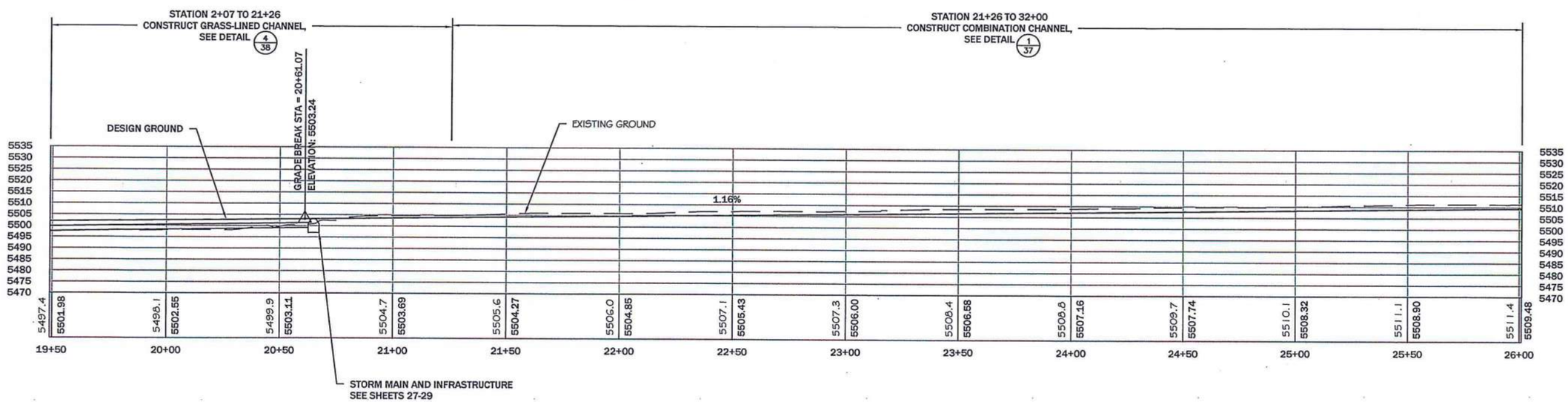
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CHANNEL PLAN AND PROFILE STA 13+00 TO 19+50

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 9





NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

N

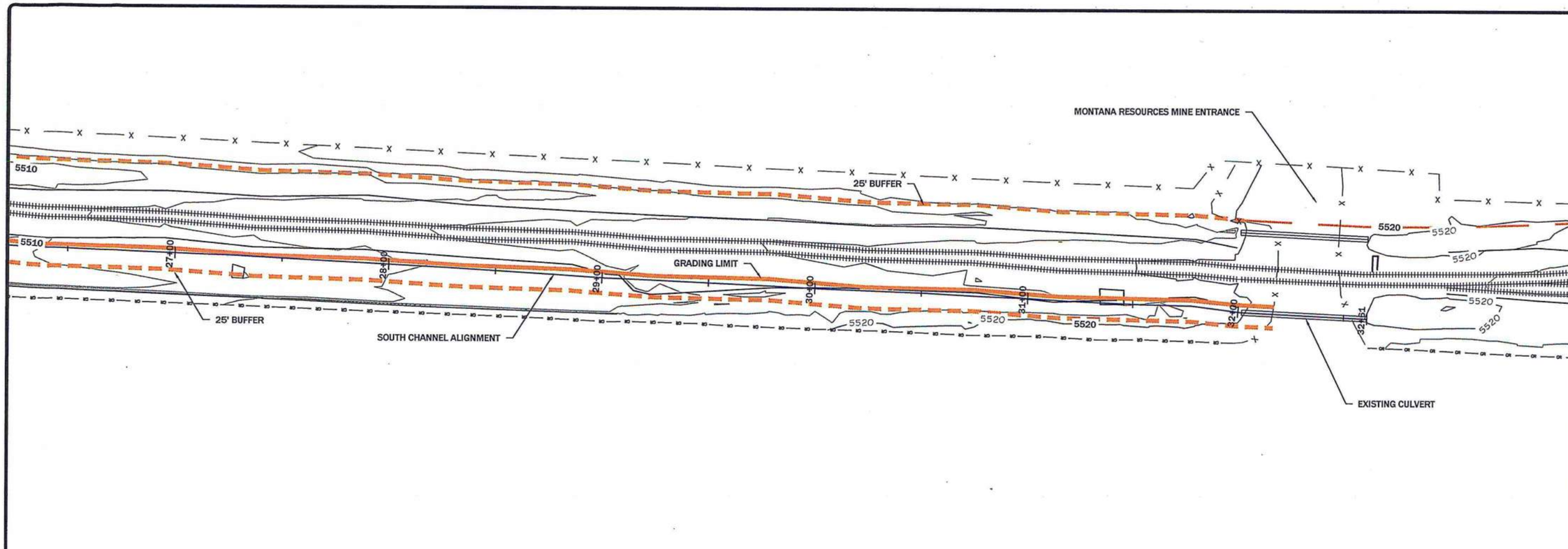
SCALE IN FEET
0 25 50

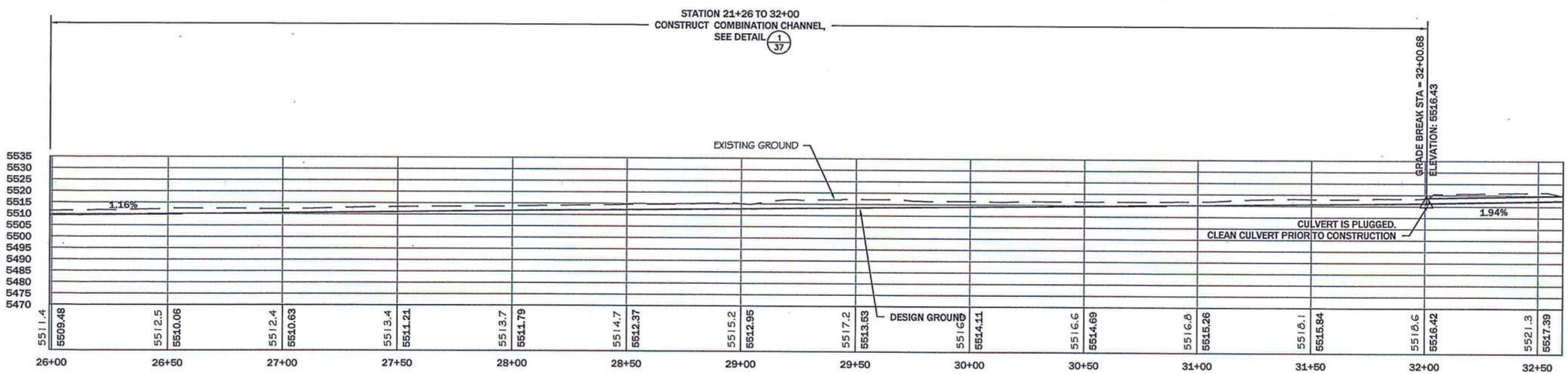
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CHANNEL
PLAN AND PROFILE
STA 19+50 TO 26+00

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
10





NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

SCALE IN FEET
0 25 50

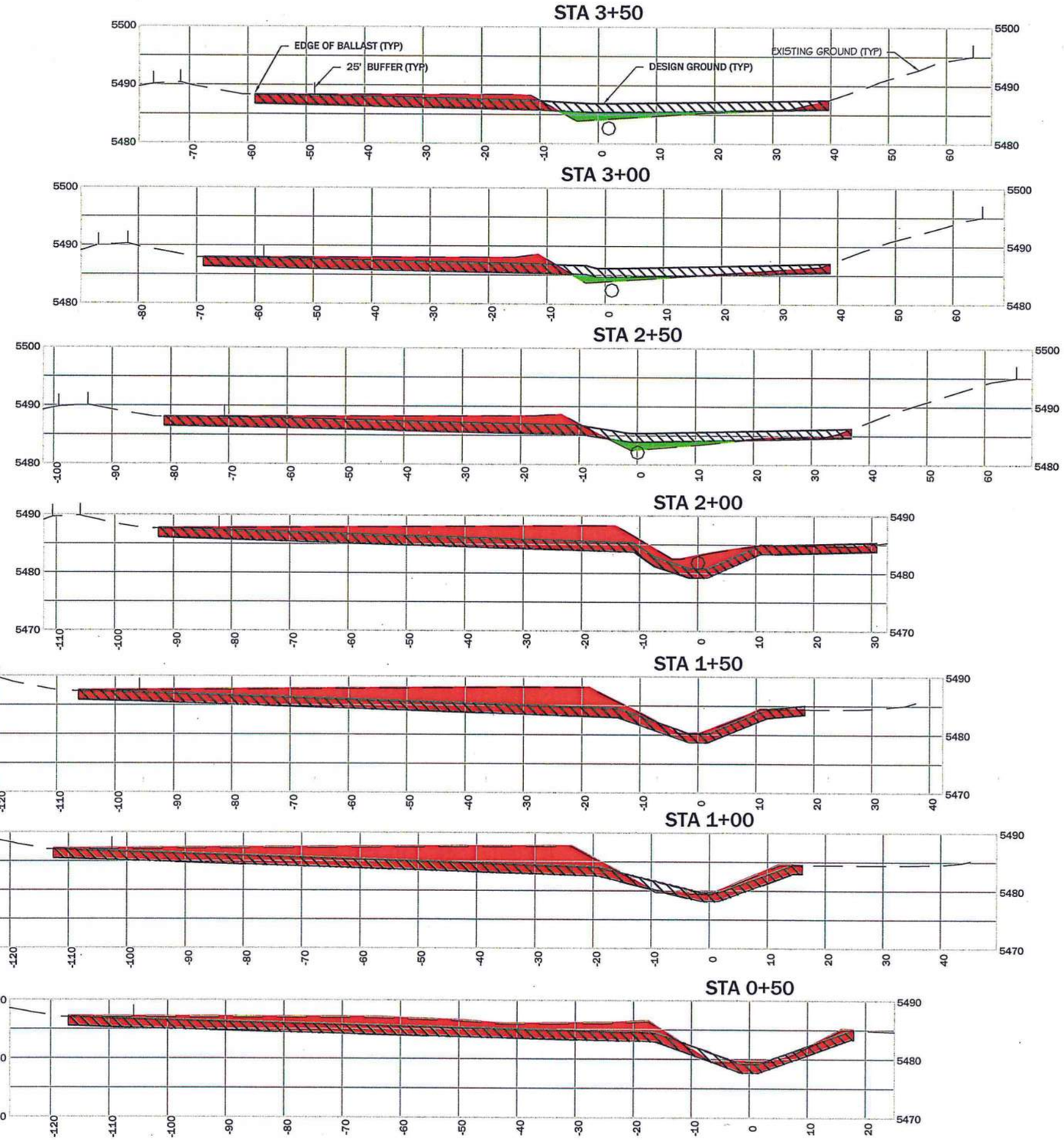
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIE CHANNEL

SOUTH CHANNEL PLAN AND PROFILE STA 26+00 TO 32+61

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 11

5/15/2014 5:45:17 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-00-PLP-005-13.DWG



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND

- CUT
- FILL
- 18" BACKFILL

REVISION:
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

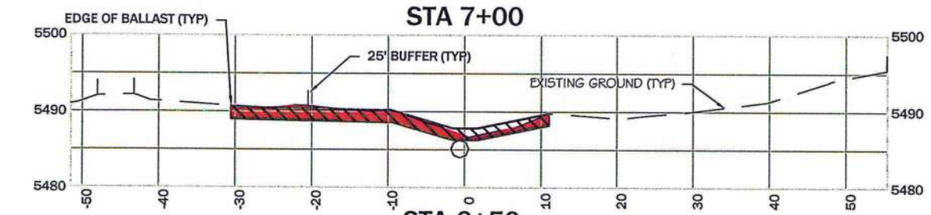
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

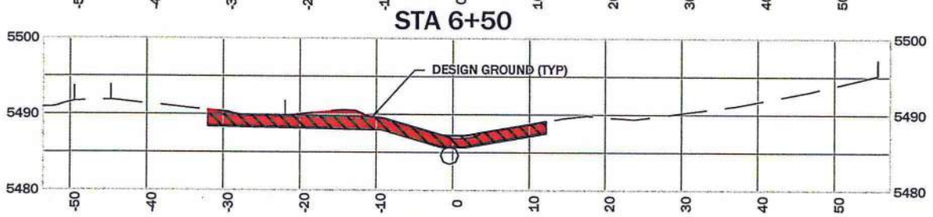
SOUTH CROSS SECTIONS
STA 0+00 TO 3+50

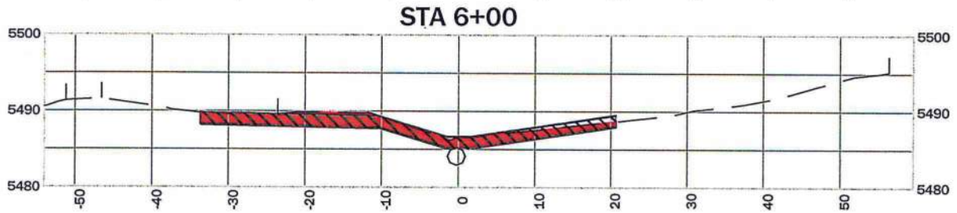
PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

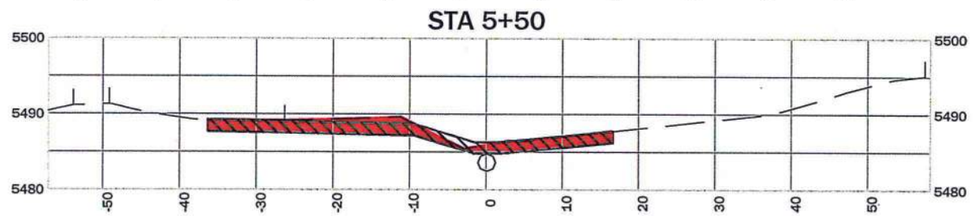
SHEET
12

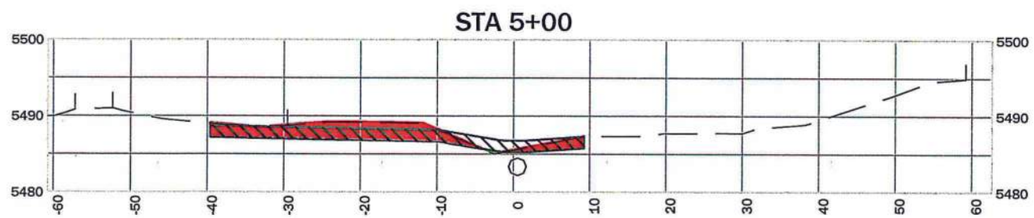
5/15/2014 2:29:08 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-XSF-003-13.DWG

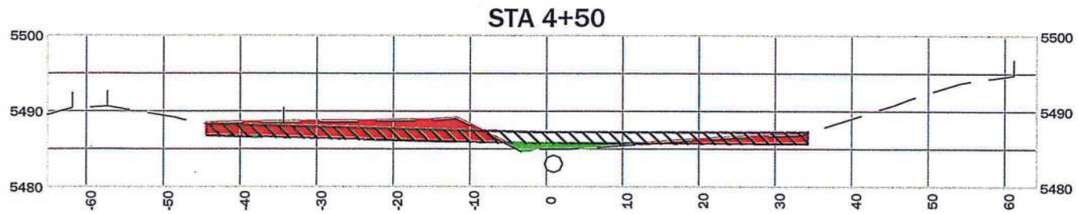


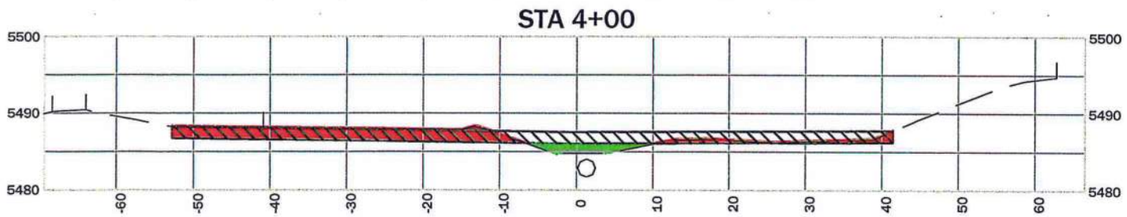










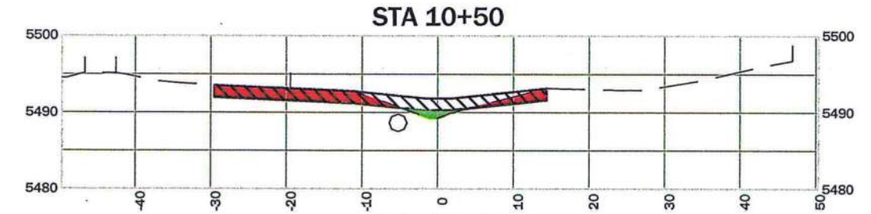


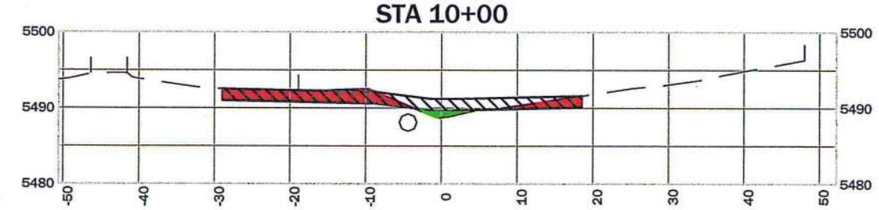
LEGEND

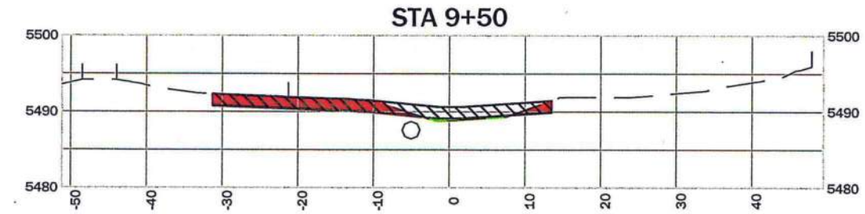
- CUT
- FILL
- 18" BACKFILL

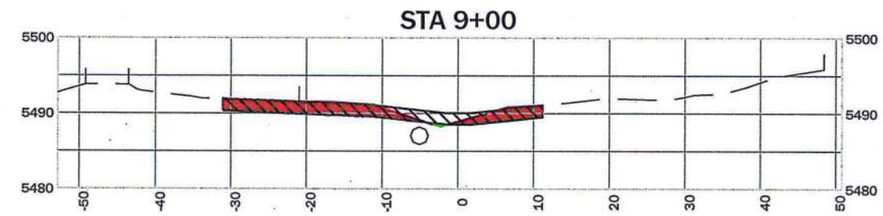
NOTES:

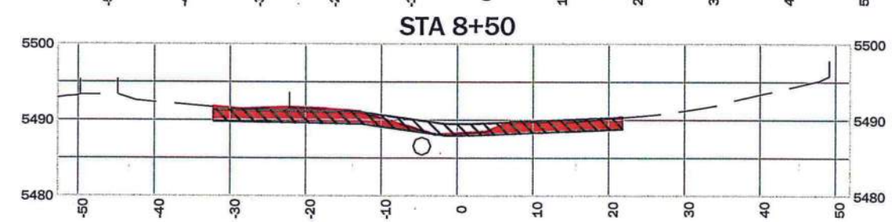
1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

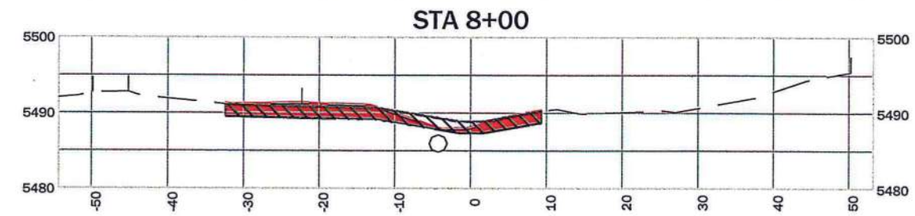


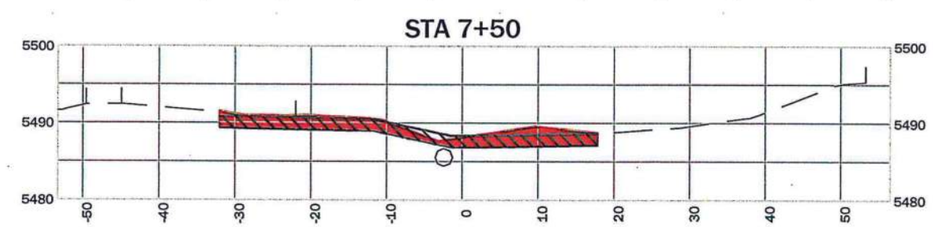












REVISION:
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CROSS SECTIONS
STA 4+00 TO 10+50

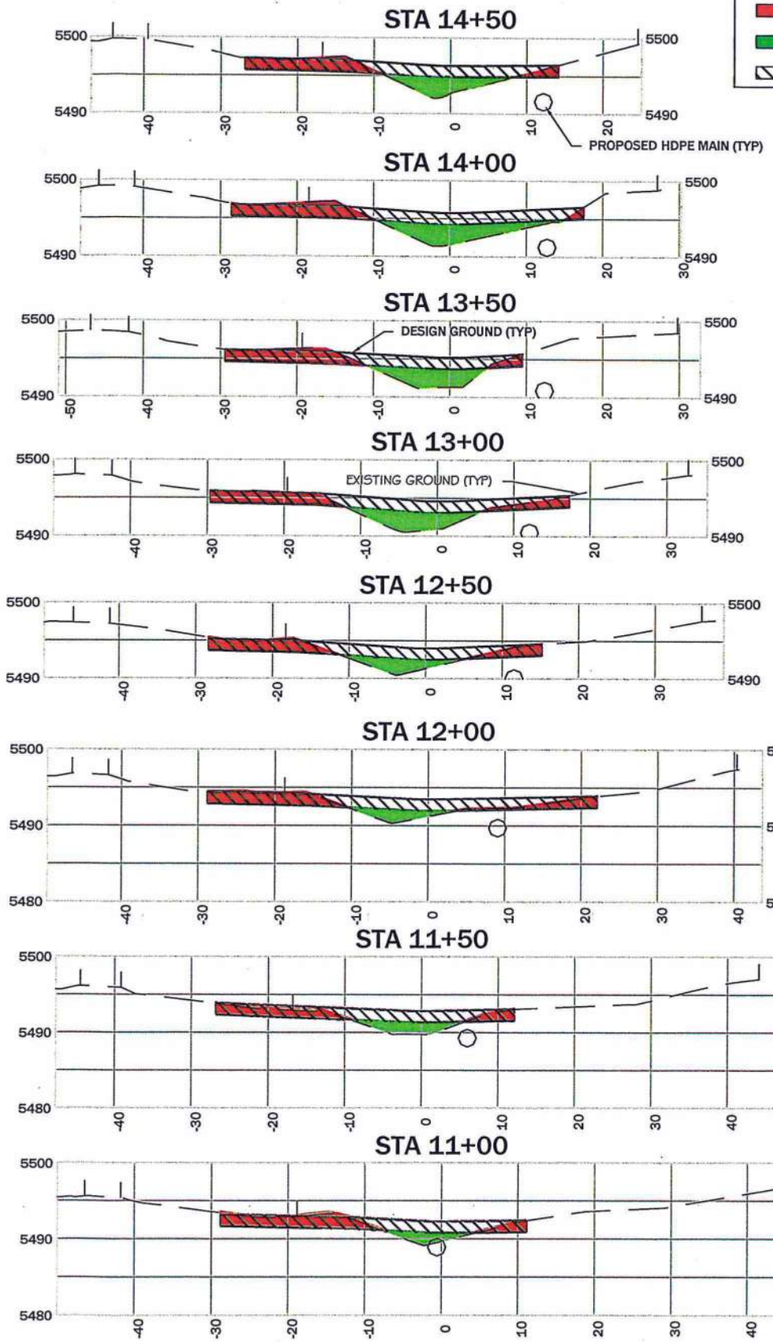
PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

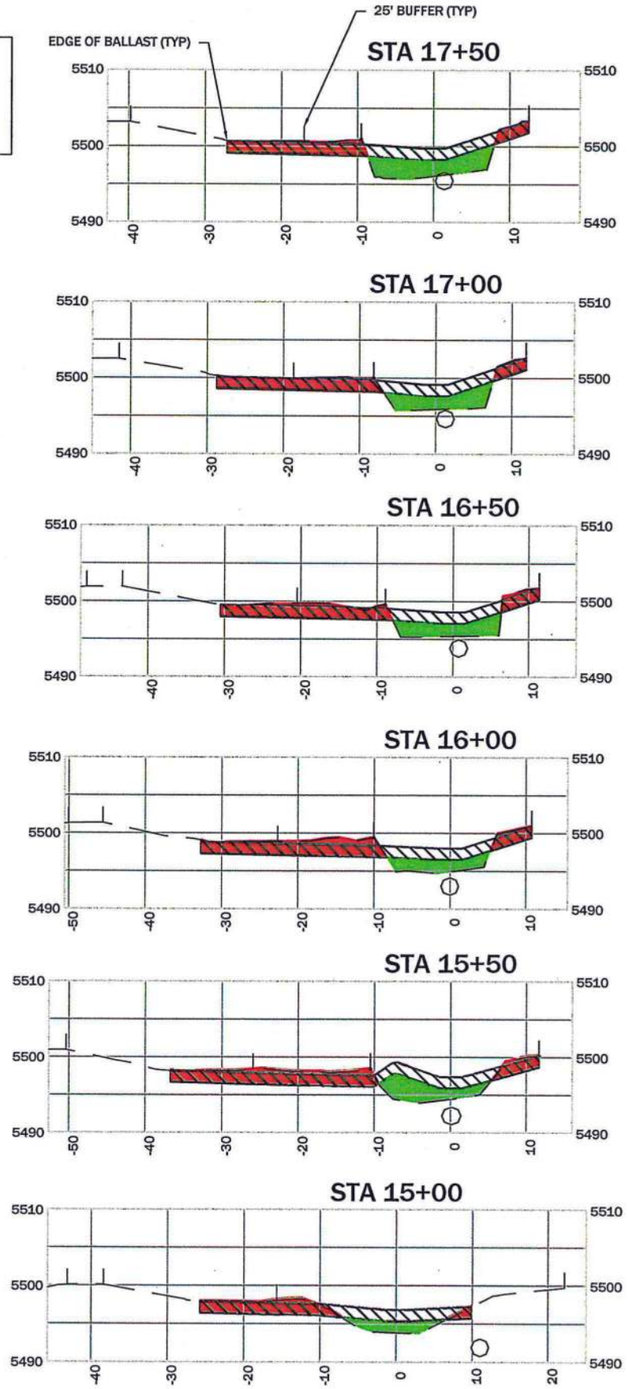
SHEET 13

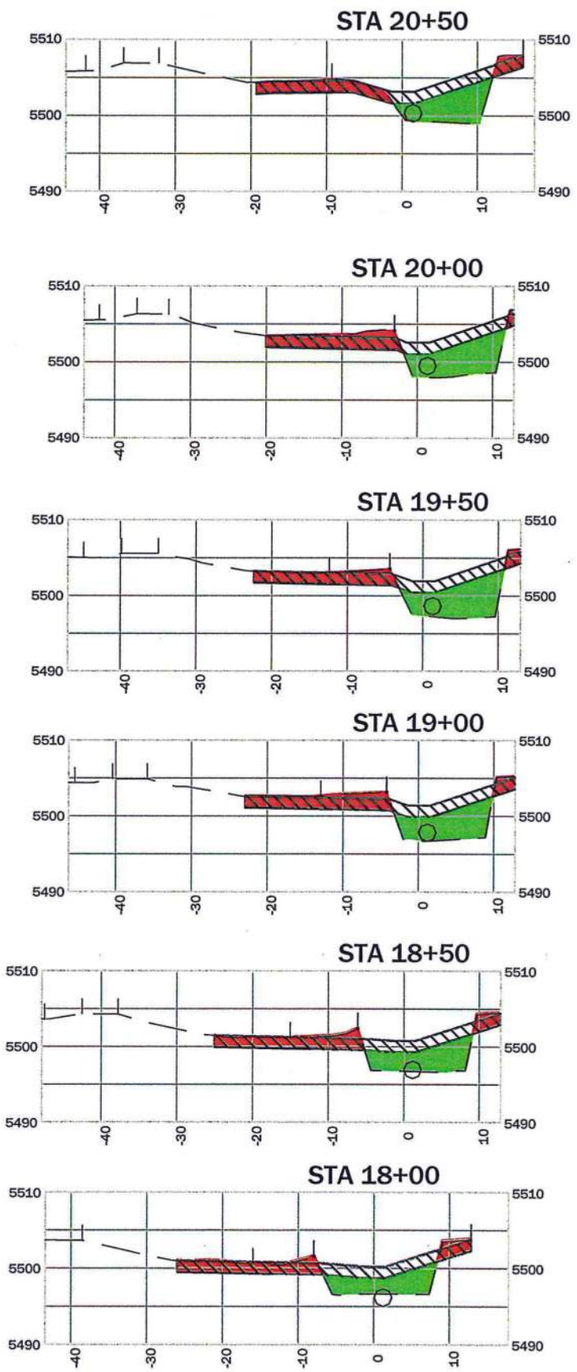
NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND
- CUT
- FILL
- 18" BACKFILL







REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

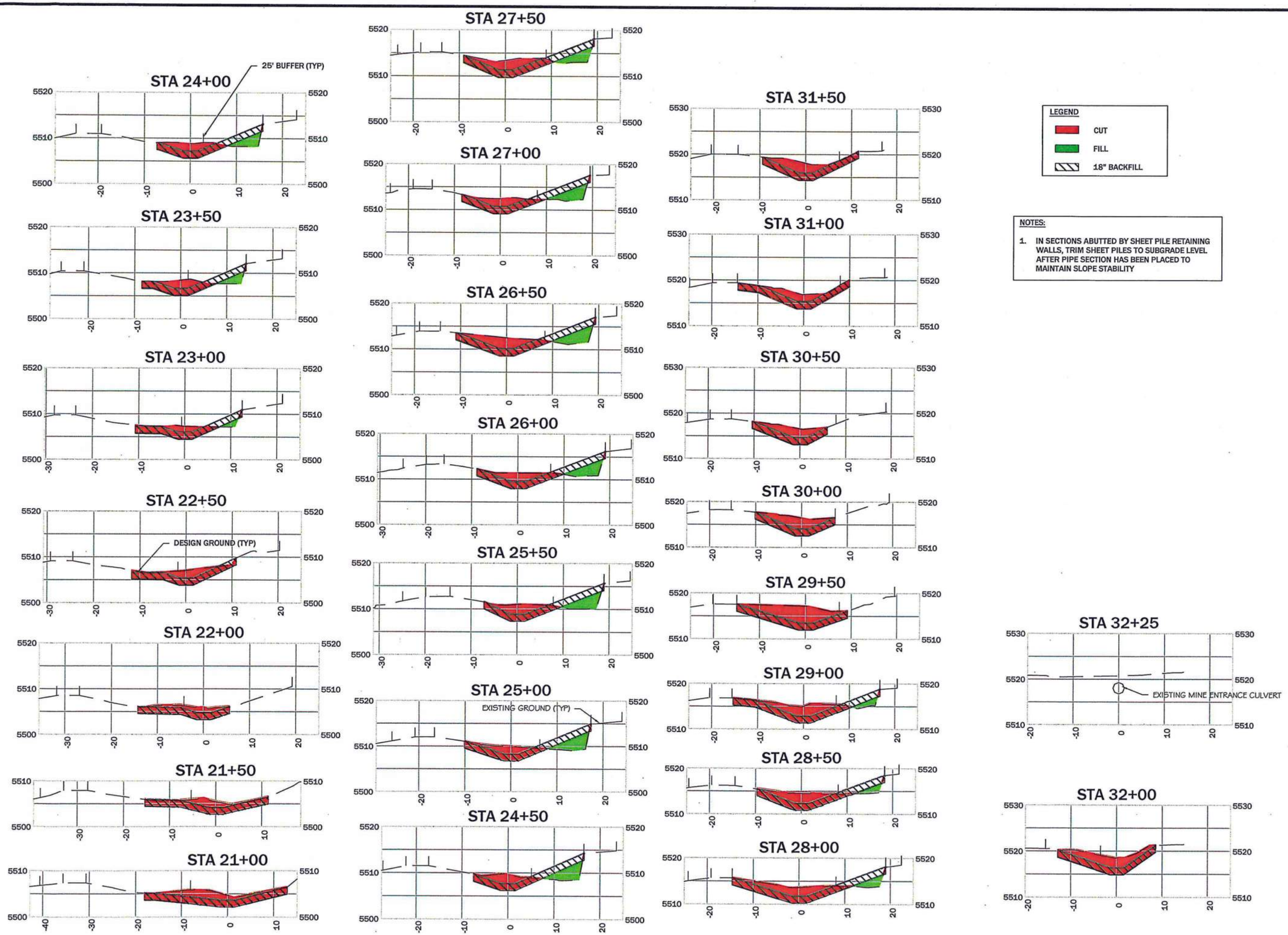
SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CROSS SECTIONS
STA 11+00 TO 20+50

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 14



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CROSS SECTIONS
STA 21+00 TO 32+25

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
15

5/15/2014 2:44:36 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-XSF-003-13.DWG

South Channel Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+00.00	0.00	21.00	0.00	0.00	0.00	0.00
0+25.00	0.00	131.79	0.00	81.60	0.00	81.60
0+50.00	0.01	295.92	0.01	198.02	0.01	279.61
0+75.00	2.74	357.47	1.20	197.51	1.21	477.12
1+00.00	0.52	353.36	1.36	139.75	2.57	616.88
1+25.00	0.01	353.61	0.23	211.75	2.80	828.62
1+50.00	0.00	356.41	0.01	263.50	2.81	1092.12
1+75.00	0.00	348.31	0.00	326.26	2.81	1418.38
2+00.00	0.00	332.58	0.00	315.22	2.81	1733.60
2+25.00	11.61	193.50	5.44	230.00	8.25	1963.60
2+50.00	18.17	173.40	13.79	169.86	22.03	2133.47
2+75.00	10.30	166.79	13.18	157.50	35.21	2290.96
3+00.00	11.72	141.57	10.19	142.76	45.41	2433.72
3+25.00	5.42	132.47	7.93	126.87	53.34	2560.58
3+50.00	24.06	104.95	13.56	113.19	66.90	2673.77
3+75.00	27.65	77.81	23.94	84.61	90.84	2758.39
4+00.00	15.30	79.19	19.88	72.69	110.72	2831.08
4+25.00	12.99	84.55	13.10	75.81	123.82	2906.88
4+50.00	9.76	96.16	10.53	83.66	134.35	2990.54
4+75.00	1.79	103.36	5.35	92.37	139.70	3082.92
5+00.00	0.54	72.91	1.08	81.61	140.78	3164.52
5+25.00	0.00	65.06	0.25	63.87	141.03	3228.40
5+50.00	0.00	80.21	0.00	67.26	141.03	3295.65
5+75.00	0.00	102.66	0.00	84.14	141.03	3379.80
6+00.00	0.00	75.71	0.00	82.58	141.03	3462.38
6+25.00	0.00	83.97	0.00	73.93	141.03	3536.30
6+50.00	0.00	71.77	0.00	72.10	141.03	3608.41
6+75.00	0.00	76.43	0.00	68.61	141.03	3677.02
7+00.00	0.00	52.72	0.00	59.79	141.03	3736.81
7+25.00	0.00	76.20	0.00	60.24	141.03	3797.05
7+50.00	0.00	81.07	0.00	72.81	141.03	3869.86
7+75.00	0.00	70.20	0.00	70.03	141.03	3939.89
8+00.00	0.00	55.84	0.00	57.47	141.03	3997.36
8+25.00	0.00	63.12	0.00	55.07	141.03	4052.43
8+50.00	0.12	66.41	0.06	59.97	141.08	4112.40
8+75.00	0.05	54.84	0.08	56.14	141.16	4168.53
9+00.00	0.67	50.20	0.33	48.63	141.49	4217.17
9+25.00	0.40	46.90	0.50	44.95	141.99	4262.12
9+50.00	2.94	38.60	1.55	39.11	143.54	4301.23
9+75.00	1.47	47.04	2.04	39.65	145.58	4340.88
10+00.00	4.78	43.72	2.89	42.02	148.48	4382.90
10+25.00	5.60	53.53	4.81	45.49	153.28	4428.39
10+50.00	5.02	39.29	4.92	42.97	158.20	4471.36
10+75.00	7.28	40.15	5.69	36.78	163.89	4508.14
11+00.00	10.11	34.94	8.05	34.77	171.94	4542.90
11+25.00	13.04	32.02	10.71	31.00	182.66	4573.90
11+50.00	15.27	23.62	13.11	25.76	195.76	4599.66
11+75.00	6.71	34.15	10.25	27.79	206.01	4627.45
12+00.00	12.69	35.21	8.98	32.11	214.99	4659.55
12+25.00	15.23	31.43	12.93	30.85	227.92	4690.41

South Channel Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
12+50.00	17.63	30.54	15.21	28.69	243.13	4719.10
12+75.00	30.74	36.14	22.51	31.33	265.65	4750.43
13+00.00	29.40	32.09	27.84	31.59	293.49	4782.02
13+25.00	25.35	28.65	25.34	28.12	318.83	4810.14
13+50.00	27.43	31.04	24.43	27.63	343.26	4837.77
13+75.00	36.60	31.94	29.64	29.16	372.91	4866.93
14+00.00	37.18	30.92	34.16	29.10	407.07	4896.03
14+25.00	29.57	29.36	30.90	28.37	437.97	4924.40
14+50.00	24.23	29.55	24.90	27.27	462.87	4951.67
14+75.00	17.22	29.40	19.19	27.29	482.06	4978.97
15+00.00	15.56	31.50	15.18	28.19	497.23	5007.16
15+25.00	13.46	21.26	13.44	24.43	510.67	5031.58
15+50.00	28.32	59.32	20.02	46.25	530.69	5077.83
15+75.00	19.79	58.83	21.17	40.23	551.86	5118.06
16+00.00	20.78	54.08	18.78	52.27	570.65	5170.33
16+25.00	28.64	46.82	22.88	46.71	593.53	5217.05
16+50.00	27.31	47.04	25.90	43.46	619.44	5260.50
16+75.00	33.10	44.49	27.97	42.37	647.41	5302.88
17+00.00	28.54	40.51	28.54	39.35	675.94	5342.23
17+25.00	34.05	38.38	28.98	36.52	704.92	5378.75
17+50.00	39.38	37.94	34.00	35.33	738.92	5414.08
17+75.00	29.88	37.40	32.06	34.88	770.98	5448.96
18+00.00	35.94	36.90	30.47	34.40	801.45	5483.36
18+25.00	44.33	37.20	37.16	34.30	838.61	5517.66
18+50.00	41.61	38.91	39.79	35.24	878.40	5552.90
18+75.00	41.55	40.79	38.50	36.90	916.90	5589.80
19+00.00	45.48	40.30	40.29	37.54	957.19	5627.34
19+25.00	48.10	44.71	43.32	39.36	1000.51	5666.69
19+50.00	52.97	33.95	46.79	36.42	1047.30	5703.11
19+75.00	52.44	33.43	48.80	31.20	1096.10	5734.30
20+00.00	49.59	35.86	47.23	32.08	1143.34	5766.38
20+25.00	51.11	35.19	46.62	32.89	1189.96	5799.27
20+50.00	43.19	34.10	43.66	32.08	1233.61	5831.35
20+75.00	6.61	32.44	23.05	30.81	1256.67	5862.16
21+00.00	0.00	69.96	3.06	47.41	1259.73	5909.57
21+25.00	0.00	52.62	0.00	56.75	1259.73	5966.32
21+50.00	0.00	50.79	0.00	47.62	1259.73	6013.94
21+75.00	0.00	38.60	0.00	41.56	1259.73	6055.50
22+00.00	0.00	40.98	0.00	36.84	1259.73	6092.34
22+25.00	0.00	43.21	0.00	38.97	1259.73	6131.32
22+50.00	0.00	45.83	0.00	41.22	1259.73	6172.54
22+75.00	1.17	35.25	0.54	37.53	1260.27	6210.07
23+00.00	3.15	34.28	2.00	32.19	1262.27	6242.26
23+25.00	4.56	37.51	3.57	33.23	1265.84	6275.49
23+50.00	7.58	34.58	5.62	33.37	1271.46	6308.87
23+75.00	8.56	36.18	7.47	32.76	1278.93	6341.62
24+00.00	11.36	35.46	9.22	33.16	1288.15	6374.79
24+25.00	15.04	34.94	12.22	32.59	1300.37	6407.38
24+50.00	17.63	33.68	15.13	31.77	1315.50	6439.15
24+75.00	17.12	43.84	16.09	35.89	1331.59	6475.03

South Channel Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
25+00.00	17.38	39.26	15.97	38.47	1347.56	6513.50
25+25.00	17.02	37.23	15.93	35.41	1363.48	6548.92
25+50.00	16.25	39.73	15.40	35.63	1378.89	6584.55
25+75.00	16.35	46.77	14.93	40.05	1393.82	6624.60
26+00.00	15.34	42.40	14.67	41.28	1408.49	6665.88
26+25.00	15.87	59.40	14.45	47.13	1422.94	6713.01
26+50.00	17.76	54.68	15.57	52.81	1438.51	6765.83
26+75.00	17.40	61.48	16.28	53.78	1454.79	6819.61
27+00.00	15.49	39.25	15.23	46.64	1470.02	6866.24
27+25.00	14.34	45.36	13.81	39.17	1483.83	6905.41
27+50.00	13.41	49.74	12.85	44.03	1496.67	6949.44
27+75.00	11.45	60.64	11.51	51.10	1508.18	7000.54
28+00.00	8.50	61.05	9.23	56.34	1517.42	7056.88
28+25.00	4.95	47.97	6.23	50.47	1523.64	7107.36
28+50.00	5.59	51.47	4.88	46.04	1528.52	7153.39
28+75.00	5.04	47.11	4.92	45.64	1533.44	7199.03
29+00.00	5.53	63.85	4.89	51.37	1538.33	7250.40
29+25.00	0.00	71.83	2.60	62.77	1540.93	7313.17
29+50.00	0.00	83.57	0.00	71.94	1540.93	7385.11
29+75.00	0.00	51.32	0.00	62.45	1540.93	7447.56
30+00.00	0.00	50.92	0.00	47.33	1540.93	7494.89
30+25.00	0.00	52.31	0.00	47.79	1540.93	7542.68
30+50.00	0.00	45.00	0.00	45.05	1540.93	7587.73
30+75.00	0.00	49.37	0.00	43.74	1540.93	7631.47
31+00.00	0.00	53.00	0.00	47.39	1540.93	7678.86
31+25.00	0.00	54.82	0.00	49.91	1540.93	7728.78
31+50.00	0.00	52.82	0.00	49.83	1540.93	7778.61
31+75.00	0.00	51.10	0.00	48.12	1540.93	7826.73
32+00.00	0.00	63.04	0.00	53.00	1540.93	7879.73
32+25.00	0.00	0.00	0.00	29.01	1540.93	7908.74
32+50.00	0.00	0.00	0.00	0.00	1540.93	7908.74

REVISION:
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

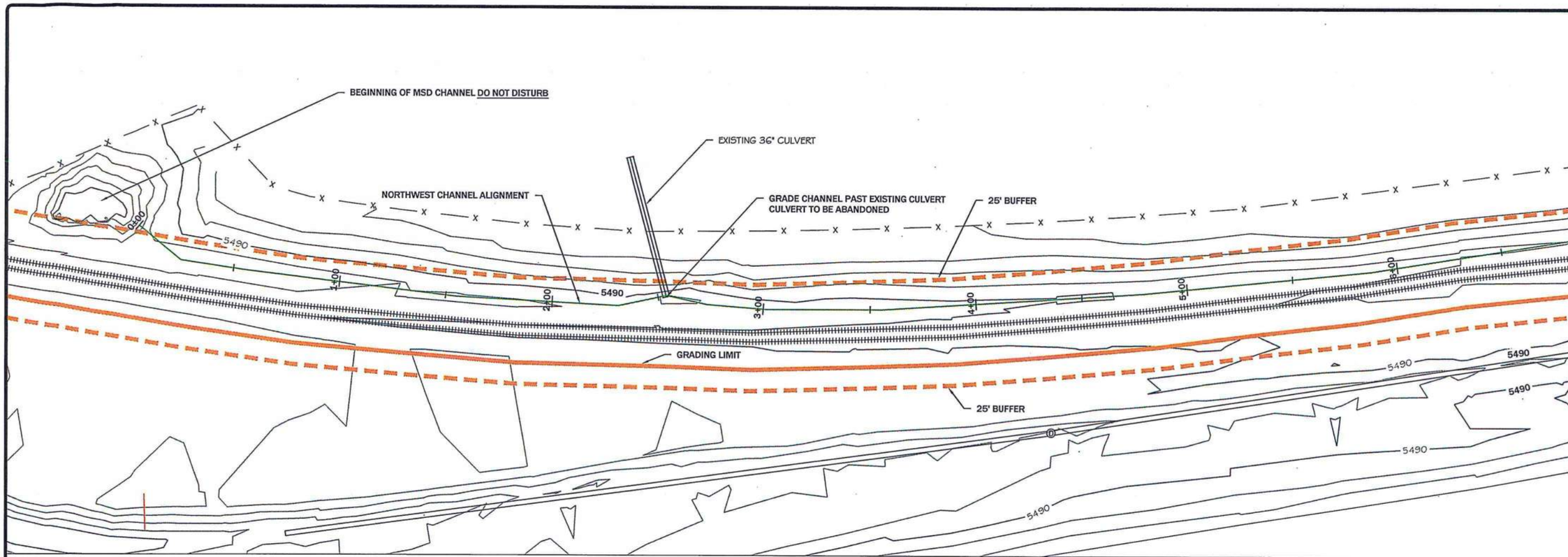
SCALE IN FEET
0

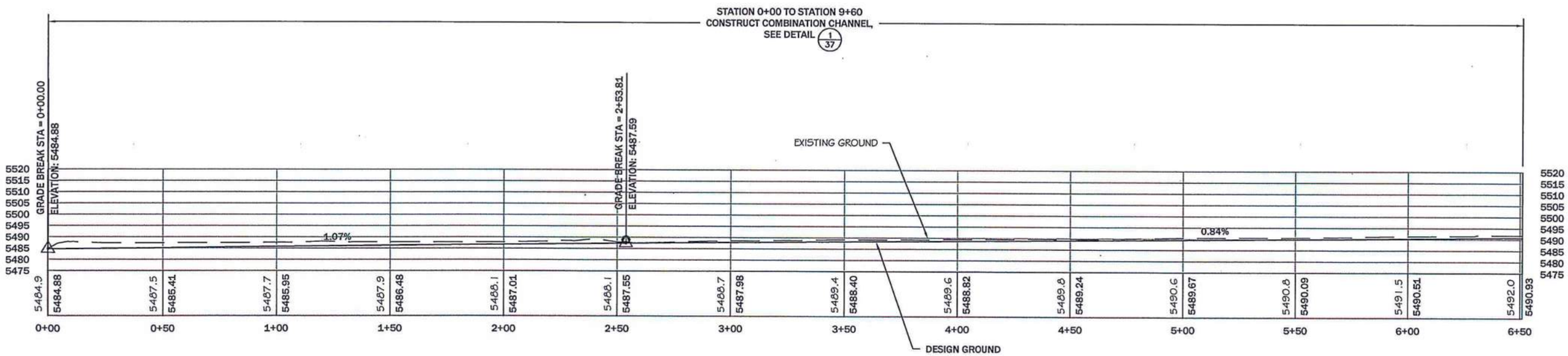
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

SOUTH CROSS SECTIONS VOLUME TABLES

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 16





NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION: DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

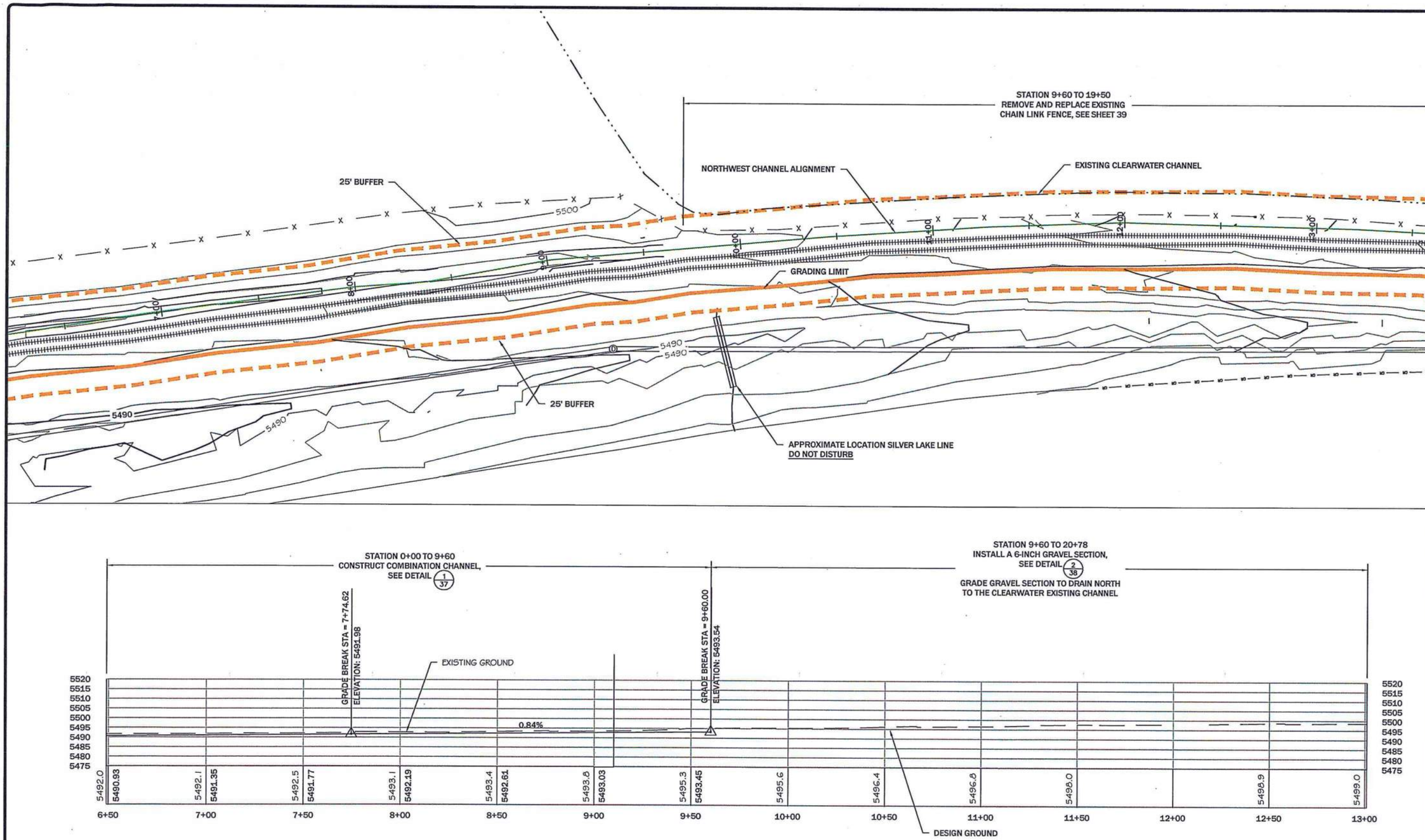
SCALE IN FEET
0 25 50

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH WEST CHANNEL PLAN AND PROFILE STA 0+00 TO 6+50

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 17



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

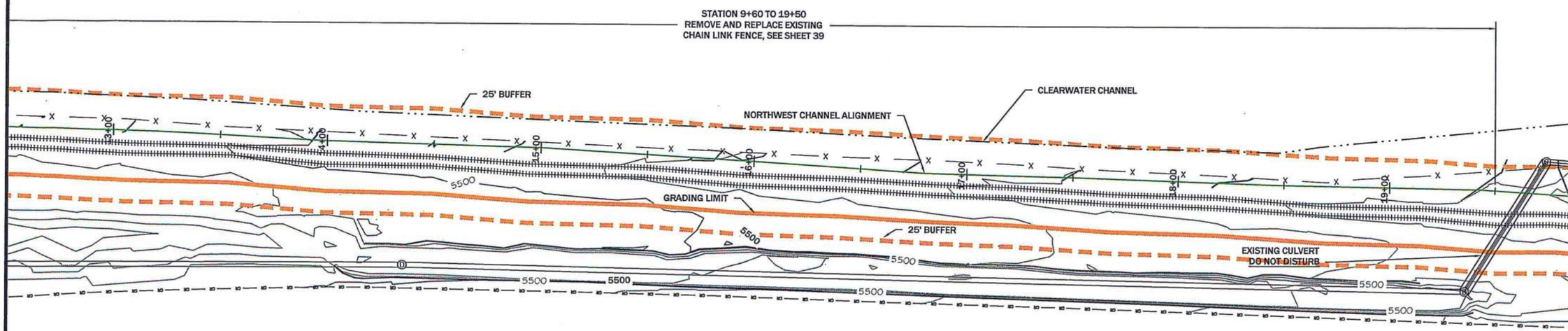
SCALE IN FEET
0 25 50

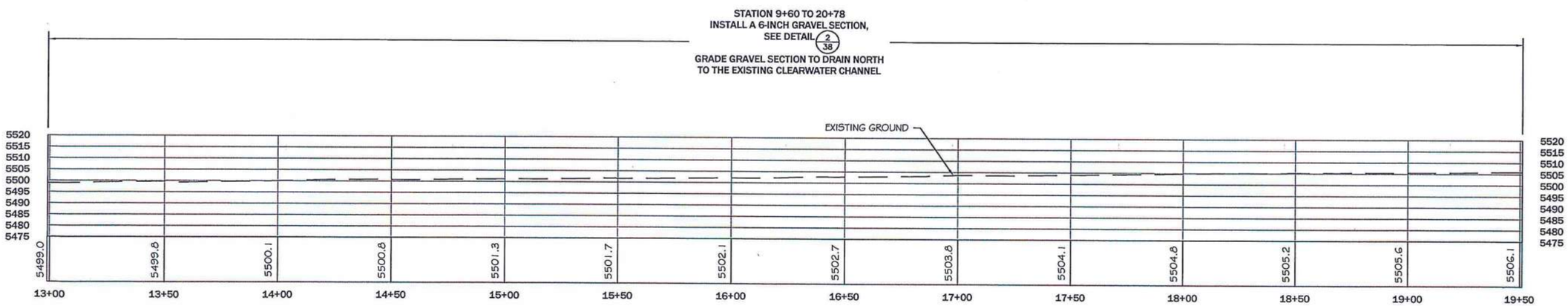
THIRD CYCLE STORM WATER
BMP'S
CONT ROADSIDE CHANNEL

NORTH WEST
CHANNEL
PLAN AND PROFILE
STA 6+50 TO 13+00

PIONEER
TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
18





NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

N

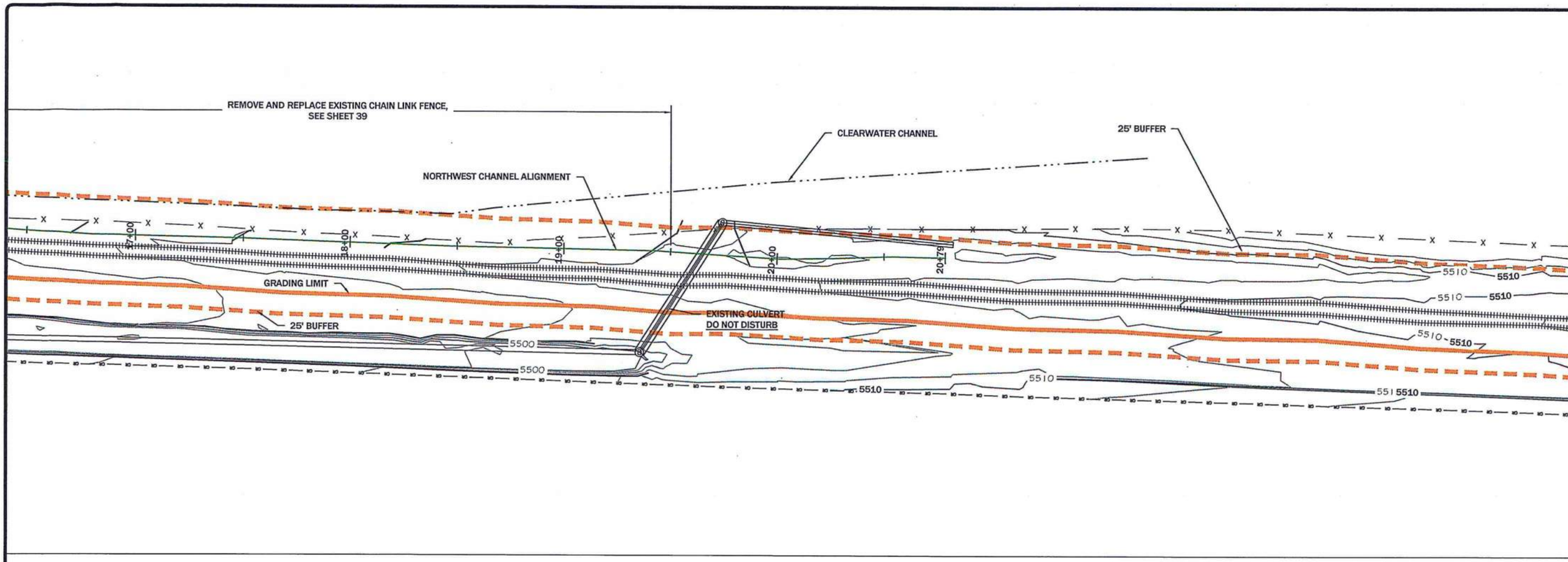
SCALE IN FEET
0 25 50

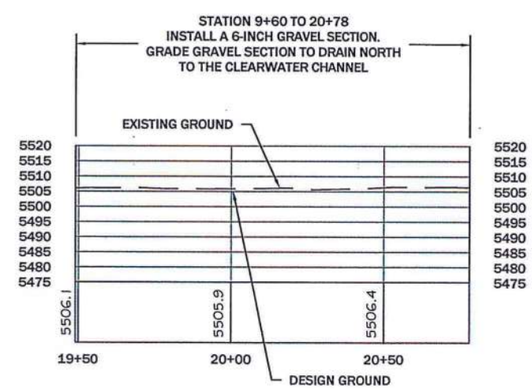
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH WEST CHANNEL PLAN AND PROFILE STA 13+00 TO 19+50

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 19





NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

N

SCALE IN FEET
0 25 50

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH WEST CHANNEL PLAN AND PROFILE STA 19+50 TO 20+78

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 20

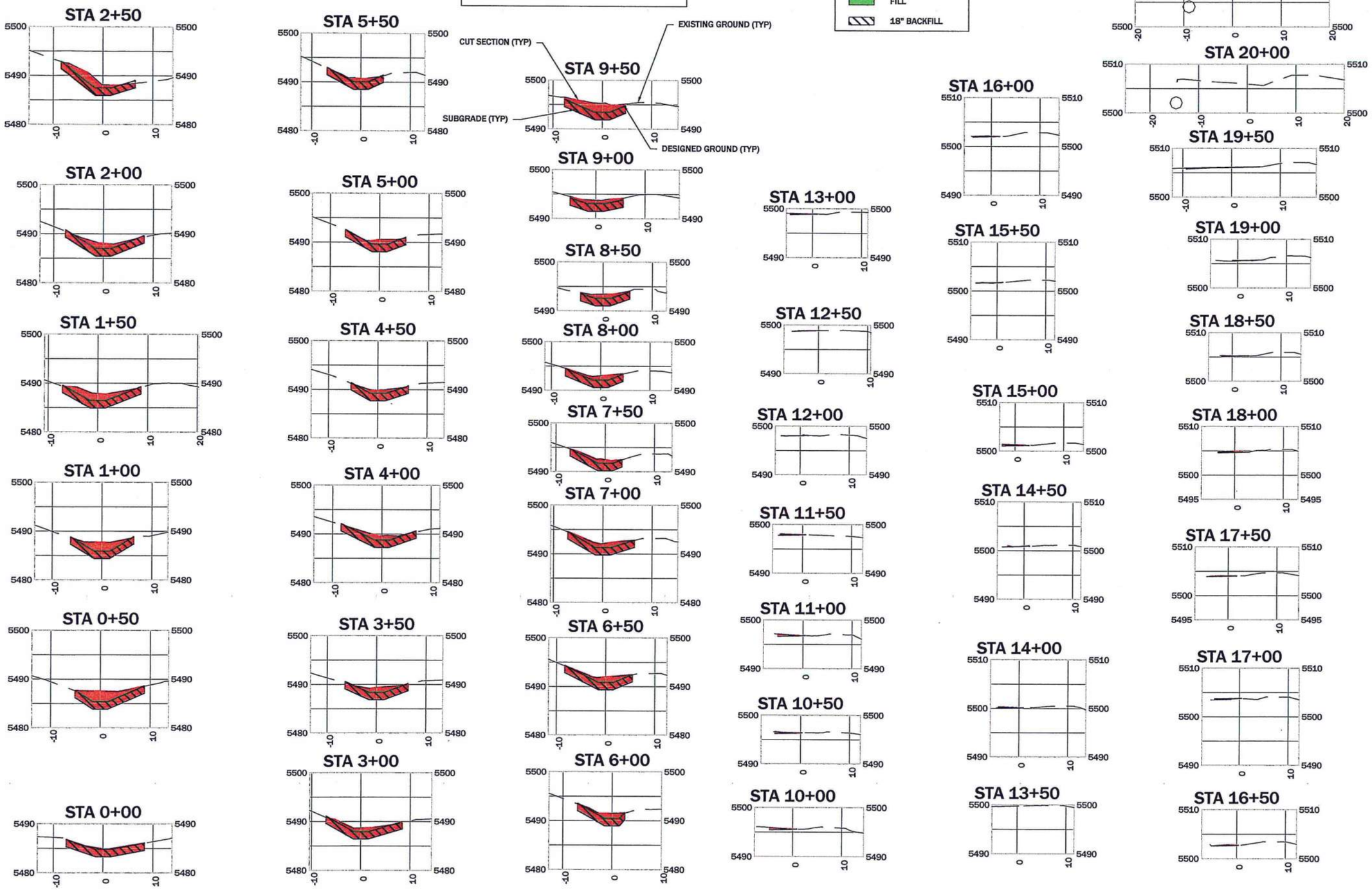
5/15/2014 5:07:40 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-PLP-007-13.DWG

NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND

- CUT
- FILL
- 18" BACKFILL



REVISION: DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH WEST CHANNEL CROSS SECTIONS
STA 0+00 TO 20+50

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 21

2/28/2014 10:55:14 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\C0\CLR-H20-C0-XSF-001-13.DWG

North West Channel Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+00.00	0.00	24.03	0.00	0.00	0.00	0.00
0+25.00	0.00	42.84	0.00	30.96	0.00	30.96
0+50.00	0.00	37.64	0.00	38.02	0.00	68.98
0+75.00	0.00	36.18	0.00	34.20	0.00	103.18
1+00.00	0.00	31.42	0.00	31.29	0.00	134.48
1+25.00	0.00	37.10	0.00	31.72	0.00	166.20
1+50.00	0.00	37.66	0.00	34.61	0.00	200.81
1+75.00	0.00	31.17	0.00	31.94	0.00	232.75
2+00.00	0.00	32.18	0.00	29.33	0.00	262.08
2+25.00	0.00	35.75	0.00	31.45	0.00	293.53
2+50.00	0.00	33.74	0.00	31.89	0.00	325.42
2+75.00	0.00	24.01	0.00	27.14	0.00	352.56
3+00.00	0.00	28.79	0.00	24.44	0.00	377.00
3+25.00	0.00	29.39	0.00	26.93	0.00	403.94
3+50.00	0.00	25.21	0.00	25.28	0.00	429.22
3+75.00	0.00	32.17	0.00	26.53	0.00	455.75
4+00.00	0.00	29.27	0.00	28.44	0.00	484.19
4+25.00	0.00	29.98	0.00	27.43	0.00	511.62
4+50.00	0.00	21.88	0.00	24.01	0.00	535.63
4+75.00	0.00	23.43	0.00	20.98	0.00	556.61
5+00.00	0.00	22.52	0.00	21.27	0.00	577.87
5+25.00	0.00	21.63	0.00	20.44	0.00	598.31
5+50.00	0.00	21.28	0.00	19.86	0.00	618.17
5+75.00	0.00	19.15	0.00	18.72	0.00	636.89
6+00.00	0.00	19.72	0.00	17.92	0.00	654.81
6+25.00	0.00	20.95	0.00	18.83	0.00	673.64
6+50.00	0.00	27.92	0.00	22.63	0.00	696.26
6+75.00	0.00	22.53	0.00	23.36	0.00	719.62
7+00.00	0.00	27.85	0.00	23.33	0.00	742.95
7+25.00	0.00	26.18	0.00	25.01	0.00	767.97
7+50.00	0.00	21.00	0.00	21.84	0.00	789.81
7+75.00	0.00	24.54	0.00	21.08	0.00	810.89
8+00.00	0.00	23.97	0.00	22.46	0.00	833.35
8+25.00	0.00	22.37	0.00	21.51	0.00	854.85
8+50.00	0.00	20.79	0.00	19.94	0.00	874.79
8+75.00	0.00	21.95	0.00	19.79	0.00	894.58
9+00.00	0.00	22.81	0.00	20.73	0.00	915.30
9+25.00	0.00	18.51	0.00	19.14	0.00	934.44
9+50.00	0.00	34.03	0.00	24.33	0.00	958.77
9+75.00	0.00	1.04	0.00	16.23	0.00	975.00
10+00.00	0.00	1.03	0.00	0.96	0.00	975.96
10+25.00	0.00	0.85	0.00	0.87	0.00	976.83
10+50.00	0.00	0.62	0.00	0.68	0.00	977.52
10+75.00	0.00	1.04	0.00	0.77	0.00	978.29
11+00.00	0.00	1.06	0.00	0.97	0.00	979.26
11+25.00	0.19	0.23	0.09	0.60	0.09	979.86
11+50.00	0.00	0.61	0.09	0.39	0.18	980.25
11+75.00	0.00	0.17	0.00	0.36	0.18	980.61
12+00.00	0.00	0.04	0.00	0.10	0.18	980.71
12+25.00	0.00	0.02	0.00	0.03	0.18	980.74

North West Channel Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
12+50.00	0.00	0.11	0.00	0.06	0.18	980.80
12+75.00	0.00	1.00	0.00	0.51	0.18	981.31
13+00.00	0.00	0.61	0.00	0.74	0.18	982.05
13+25.00	0.00	0.28	0.00	0.41	0.18	982.47
13+50.00	0.10	0.00	0.04	0.13	0.23	982.59
13+75.00	0.00	0.81	0.04	0.37	0.27	982.97
14+00.00	0.01	0.45	0.00	0.58	0.27	983.55
14+25.00	0.00	0.11	0.00	0.26	0.28	983.81
14+50.00	0.30	0.07	0.14	0.09	0.42	983.90
14+75.00	0.00	0.71	0.14	0.36	0.56	984.26
15+00.00	0.00	0.79	0.00	0.70	0.56	984.96
15+25.00	0.14	0.05	0.06	0.39	0.62	985.35
15+50.00	0.24	0.03	0.18	0.03	0.80	985.38
15+75.00	0.00	1.13	0.11	0.54	0.91	985.92
16+00.00	0.00	0.52	0.00	0.76	0.91	986.68
16+25.00	0.61	0.00	0.28	0.24	1.19	986.92
16+50.00	0.00	0.40	0.28	0.18	1.47	987.11
16+75.00	0.00	0.80	0.00	0.55	1.47	987.66
17+00.00	0.72	0.01	0.33	0.37	1.80	988.03
17+25.00	0.00	0.10	0.33	0.05	2.13	988.09
17+50.00	0.00	0.12	0.00	0.10	2.14	988.19
17+75.00	0.06	0.02	0.03	0.06	2.16	988.25
18+00.00	0.00	0.64	0.03	0.31	2.19	988.55
18+25.00	0.00	0.66	0.00	0.60	2.19	989.16
18+50.00	0.00	0.25	0.00	0.42	2.19	989.58
19+00.00	0.61	0.00	0.56	0.23	2.75	989.82
19+50.00	0.87	0.00	1.37	0.00	4.12	989.82
20+00.12	0.00	0.00	0.81	0.00	4.93	989.82
20+50.00	0.00	0.00	0.00	0.00	4.93	989.82

REVISION:
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

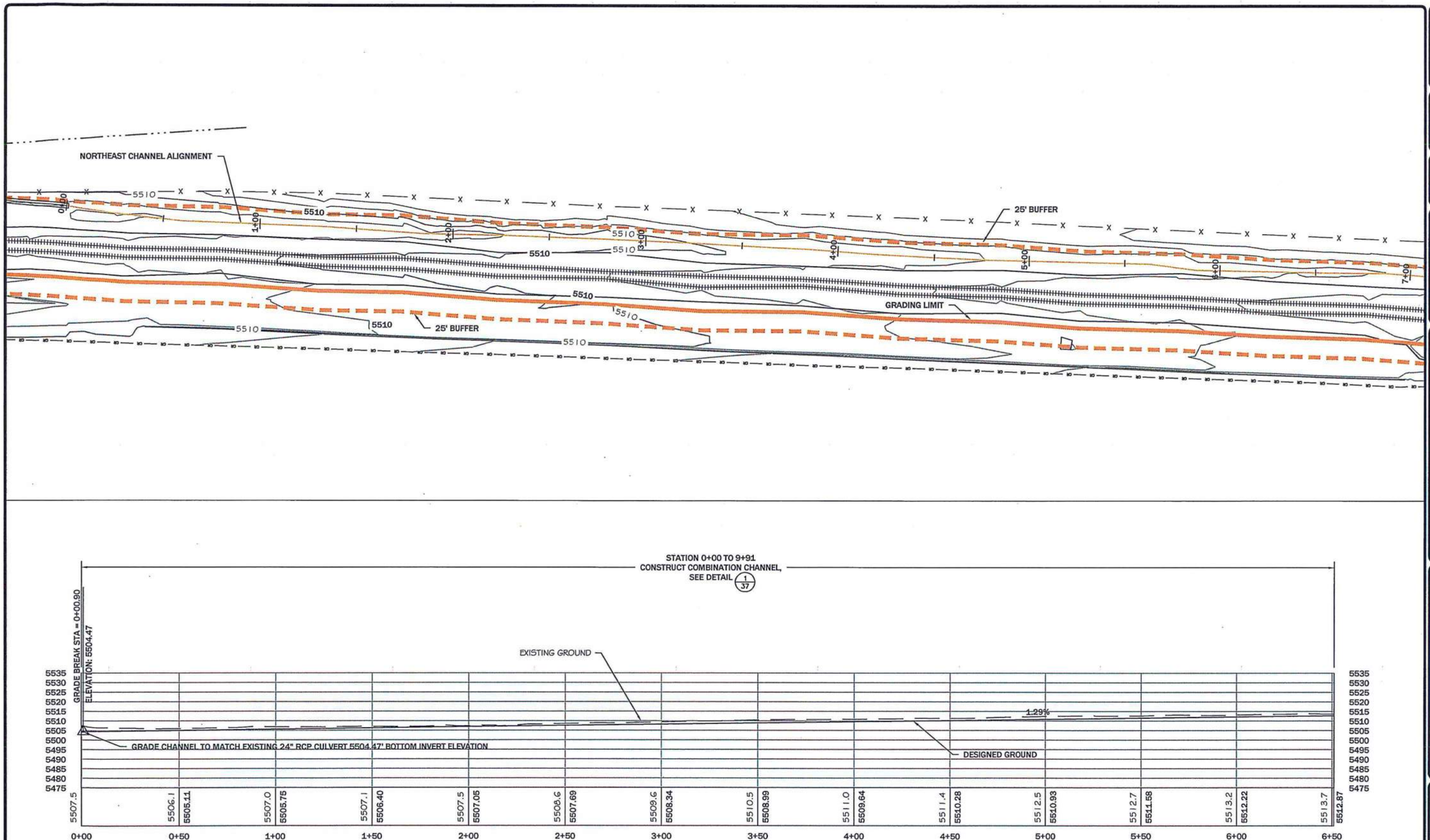
SCALE IN FEET
0

THIRD CYCLE STORM WATER
BMP'S
CONT ROADSIDE CHANNEL

NORTH WEST CHANNEL
CROSS
SECTIONS
STA 0+00 TO 20+50

PIONEER
TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
22



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

N

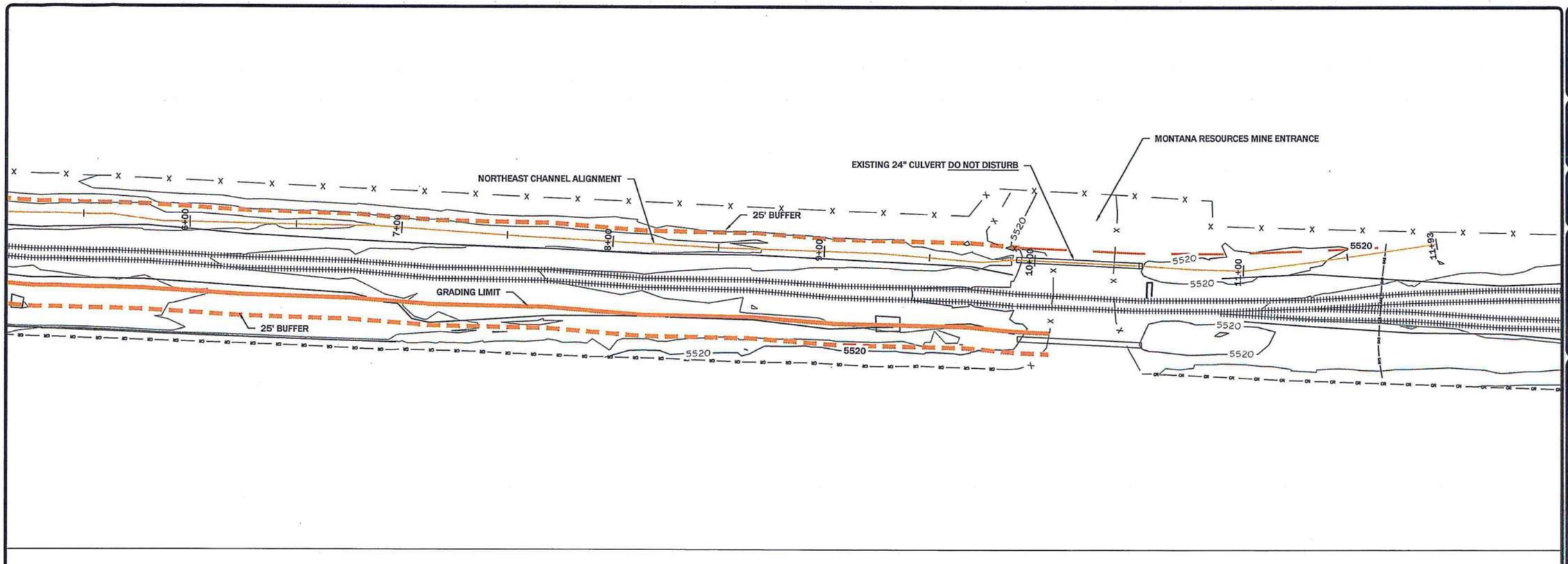
SCALE IN FEET
0 25 50

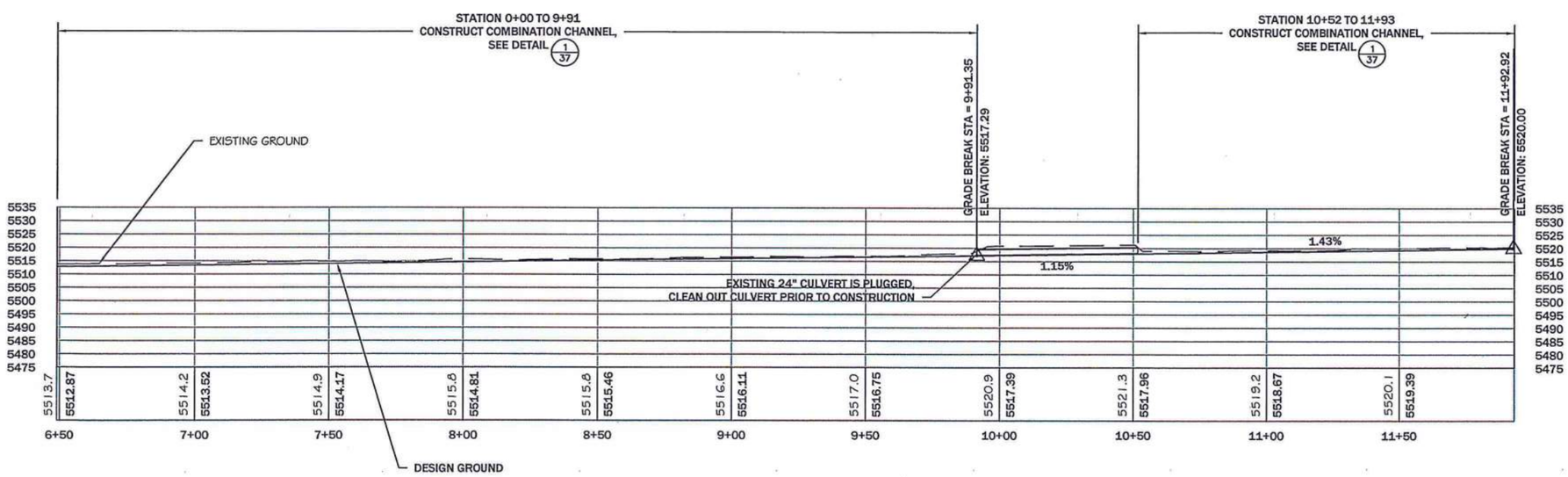
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH EAST CHANNEL PLAN AND PROFILE STA 0+00 TO 6+50

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 23





NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY
2. MAINTAIN 25' BUFFER ZONE FROM RR CENTERLINE WHEN CONSTRUCTING CHANNELS

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
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PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

SCALE IN FEET
0 25 50

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH EAST CHANNEL PLAN AND PROFILE STA 6+50 TO 11+93

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

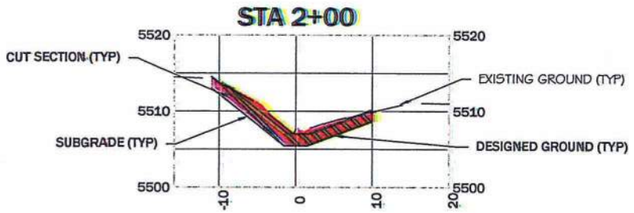
SHEET 24

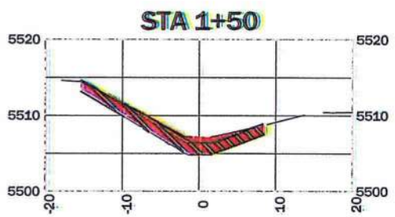
LEGEND

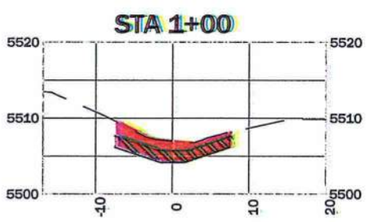
- CUT
- FILL
- 18" BACKFILL

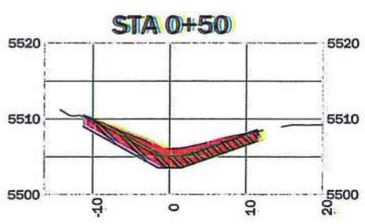
NOTES:

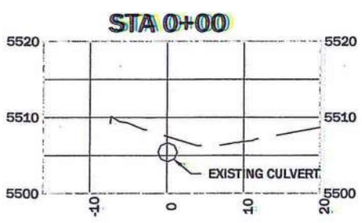
1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

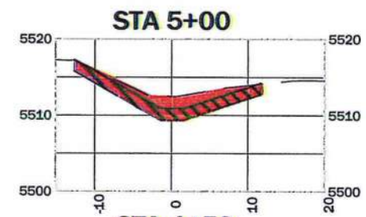


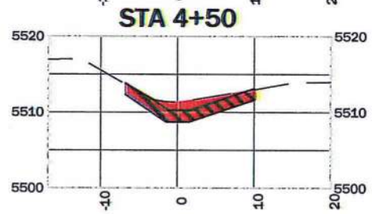


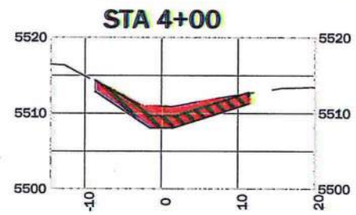


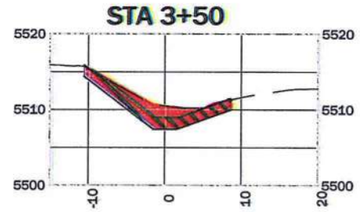


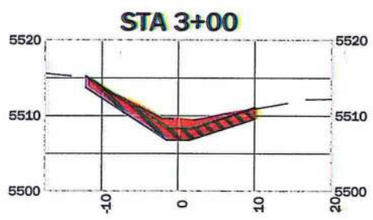


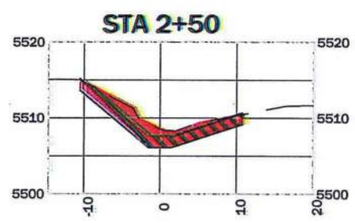


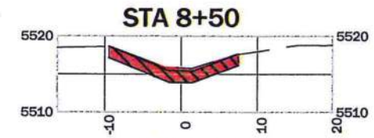


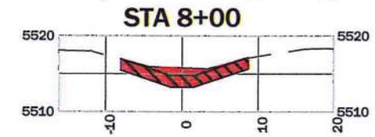


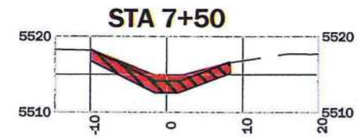


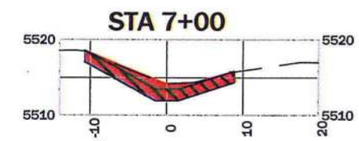


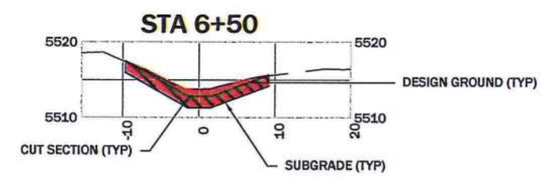


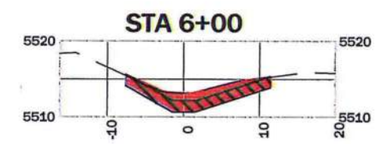


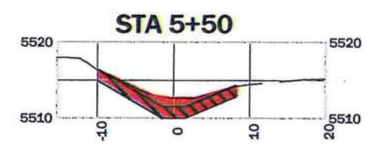


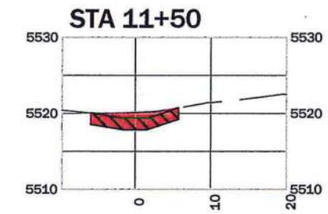


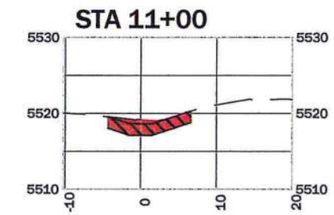


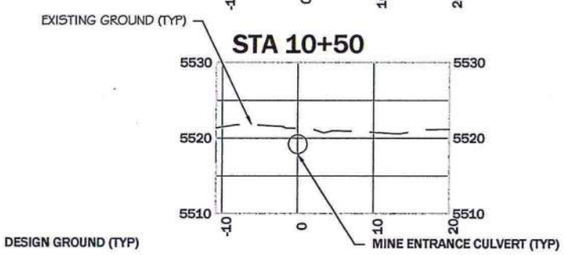


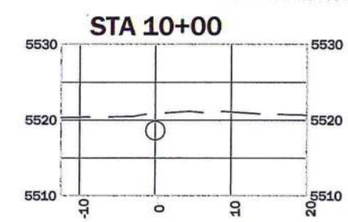


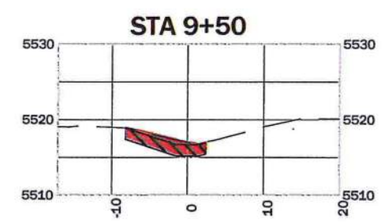


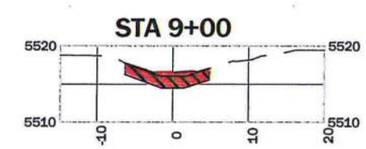












REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH EAST CHANNEL CROSS SECTIONS
STA 0+00 TO 11+50

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 25

2/28/2014 11:04:01 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-XSF-002-13.DWG

North East Channel Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+00.00	0.00	0.00	0.00	0.00	0.00	0.00
0+25.00	0.00	44.67	0.00	20.68	0.00	20.68
0+50.00	0.00	47.25	0.00	42.56	0.00	63.24
0+75.00	0.00	45.01	0.00	42.61	0.00	105.84
1+00.00	0.00	39.47	0.00	39.11	0.00	144.96
1+25.00	0.00	41.54	0.00	37.51	0.00	182.46
1+50.00	0.00	43.09	0.00	39.27	0.00	221.74
1+75.00	0.00	29.28	0.00	33.50	0.00	255.24
2+00.00	0.00	42.60	0.00	33.33	0.00	288.57
2+25.00	0.00	42.79	0.00	39.54	0.00	328.11
2+50.00	0.00	47.13	0.00	41.66	0.00	369.77
2+75.00	0.00	45.66	0.00	42.96	0.00	412.73
3+00.00	0.00	44.26	0.00	41.63	0.00	454.36
3+25.00	0.00	44.30	0.00	41.00	0.00	495.37
3+50.00	0.00	43.14	0.00	40.49	0.00	535.85
3+75.00	0.00	46.50	0.00	41.50	0.00	577.35
4+00.00	0.00	43.23	0.00	41.50	0.00	618.86
4+25.00	0.00	36.05	0.00	36.75	0.00	655.61
4+50.00	0.00	35.32	0.00	33.04	0.00	688.65
4+75.00	0.00	44.07	0.00	36.75	0.00	725.40
5+00.00	0.00	56.34	0.00	46.47	0.00	771.88
5+25.00	0.00	55.27	0.00	51.67	0.00	823.55
5+50.00	0.00	36.94	0.00	42.69	0.00	866.24
5+75.00	0.00	38.13	0.00	34.64	0.00	900.88
6+00.00	0.00	39.99	0.00	36.51	0.00	937.38
6+25.00	0.00	41.55	0.00	37.75	0.00	975.14
6+50.00	0.00	38.18	0.00	36.91	0.00	1012.05
6+75.00	0.00	40.36	0.00	36.36	0.00	1048.41
7+00.00	0.00	38.54	0.00	36.61	0.00	1085.02
7+25.00	0.00	36.04	0.00	34.53	0.00	1119.55
7+50.00	0.00	35.07	0.00	32.92	0.00	1152.47
7+75.00	0.00	40.65	0.00	35.06	0.00	1187.53
8+00.00	0.00	32.08	0.00	33.67	0.00	1221.20
8+25.00	0.00	33.04	0.00	30.15	0.00	1251.35
8+50.00	0.00	28.85	0.00	28.66	0.00	1280.01
8+75.00	0.00	17.62	0.00	21.52	0.00	1301.53
9+00.00	0.00	19.34	0.00	17.11	0.00	1318.64
9+25.00	0.00	14.14	0.00	15.50	0.00	1334.14
9+50.00	0.00	18.99	0.00	15.38	0.00	1349.52
9+75.00	0.00	29.72	0.00	22.40	0.00	1371.92
10+00.00	0.00	0.00	0.00	13.75	0.00	1385.67
10+25.00	0.00	0.00	0.00	0.00	0.00	1385.67
10+50.00	0.00	0.00	0.00	0.00	0.00	1385.67
10+75.00	0.00	26.42	0.00	12.25	0.00	1397.92
11+00.00	0.00	19.10	0.00	21.06	0.00	1418.98
11+25.00	0.00	15.93	0.00	16.32	0.00	1435.30
11+50.00	0.00	22.58	0.00	17.83	0.00	1453.13
11+75.00	0.00	14.32	0.00	17.08	0.00	1470.21

REVISION:
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

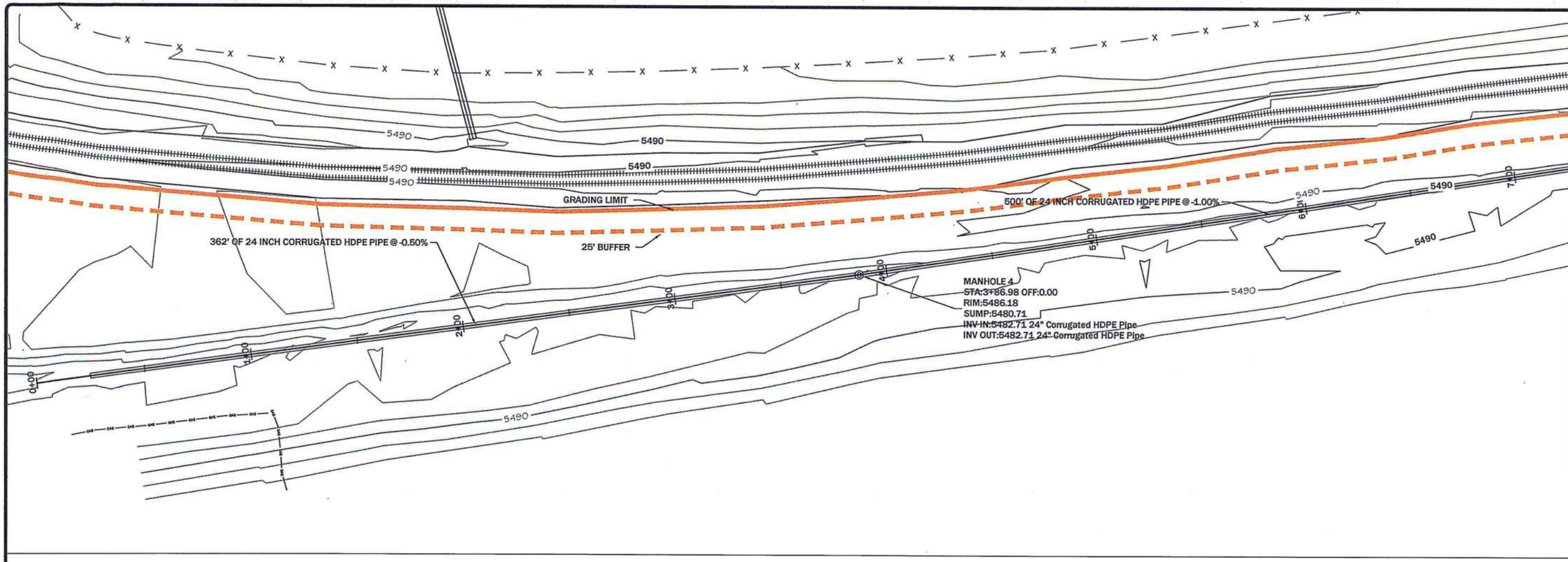
DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

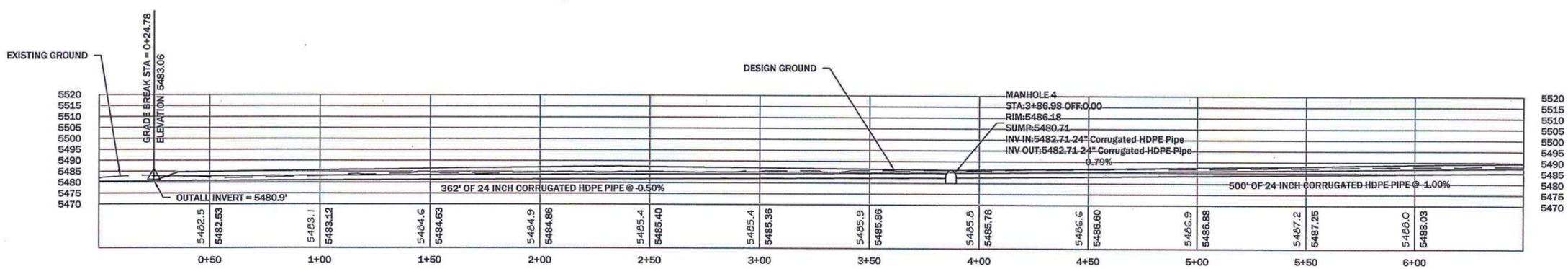
SCALE IN FEET
0

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

NORTH EAST CHANNEL CROSS SECTIONS VOLUMES

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177





NOTES:
1. PROVIDE AND INSTALL PIPING AND MANHOLES.
2. CONSTRUCT MANHOLES FROM TYPE V OR APPROVED EQUIVALENT CONCRETE.
3. STRUCTURE SHALL BE H-20 TRAFFIC RATED
4. STORM GRATES AND FRAMES SHALL BE D&L C-1030-15 OR APPROVED EQUIVALENT (MIN 1 SF OPEN AREA)

REVISIONS
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY:
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

SCALE IN FEET
0 25 50

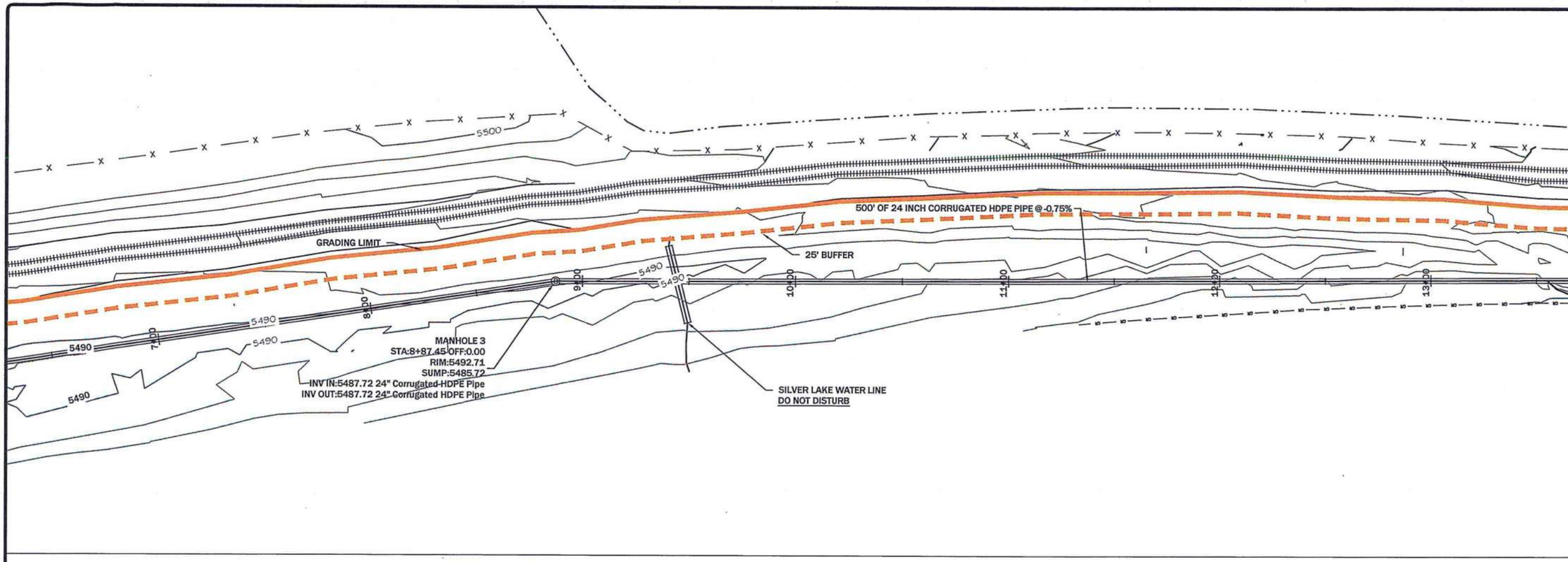
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

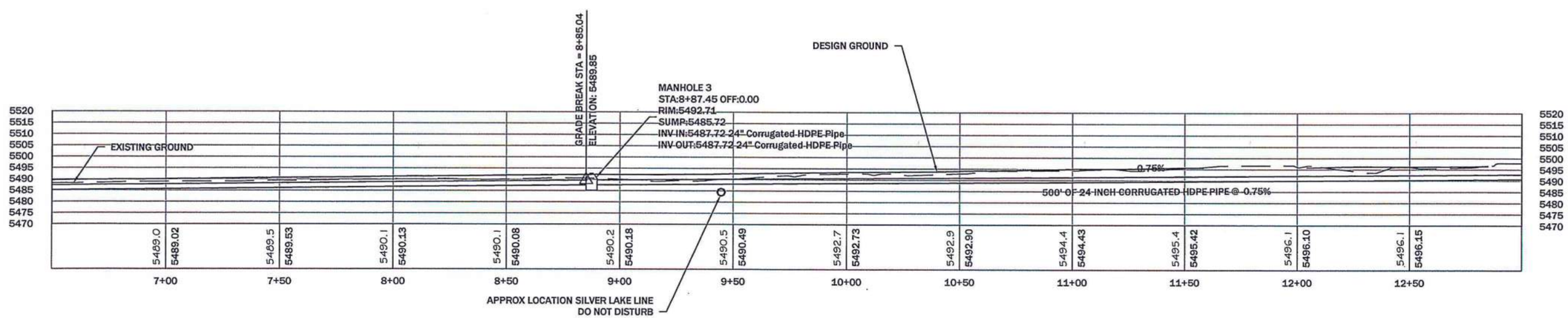
HDPE PIPING
PLAN AND PROFILE
STA 0+00 TO 6+50

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
27

5/15/2014 5:00:28 PM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-PLP-012-13.DWG





NOTES:
1. PROVIDE AND INSTALL PIPING AND MANHOLES.
2. CONSTRUCT MANHOLES FROM TYPE V OR APPROVED EQUIVALENT CONCRETE.
3. STRUCTURE SHALL BE H-20 TRAFFIC RATED
4. STORM GRATES AND FRAMES SHALL BE D&L C-1030-15 OR APPROVED EQUIVALENT (MIN 1 SF OPEN AREA)

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

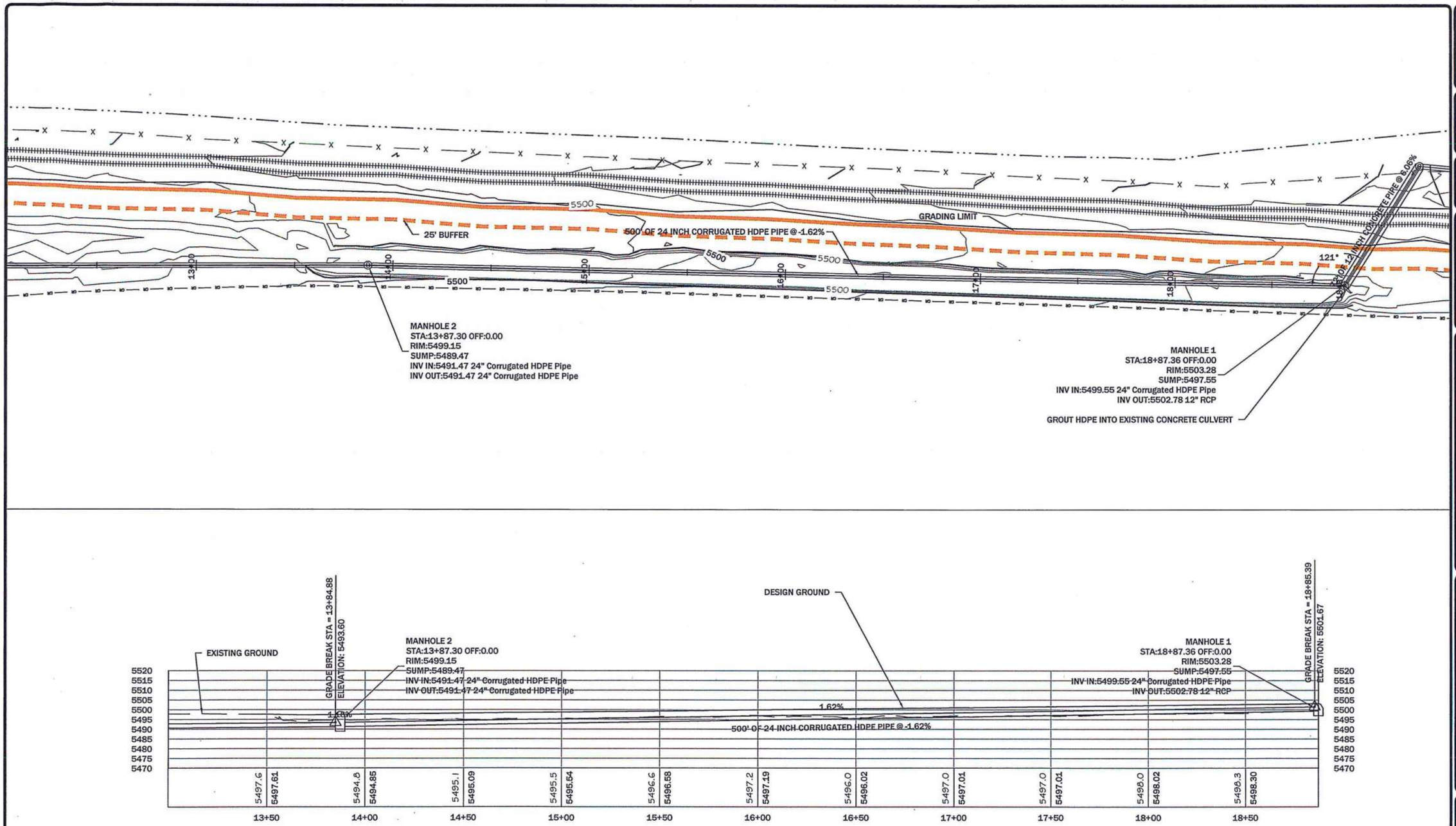
SCALE IN FEET
0 25 50

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

HDPE PIPING
PLAN AND PROFILE
STA 6+50 TO 13+00

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
28



NOTES:
1. PROVIDE AND INSTALL PIPING AND MANHOLES.
2. CONSTRUCT MANHOLES FROM TYPE V OR APPROVED EQUIVALENT CONCRETE.
3. STRUCTURE SHALL BE H-20 TRAFFIC RATED
4. STORM GRATES AND FRAMES SHALL BE D&L C-1030-15 OR APPROVED EQUIVALENT (MIN 1 SF OPEN AREA)

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MCR
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAVD 88
UNITS: IF
SOURCE: PTS

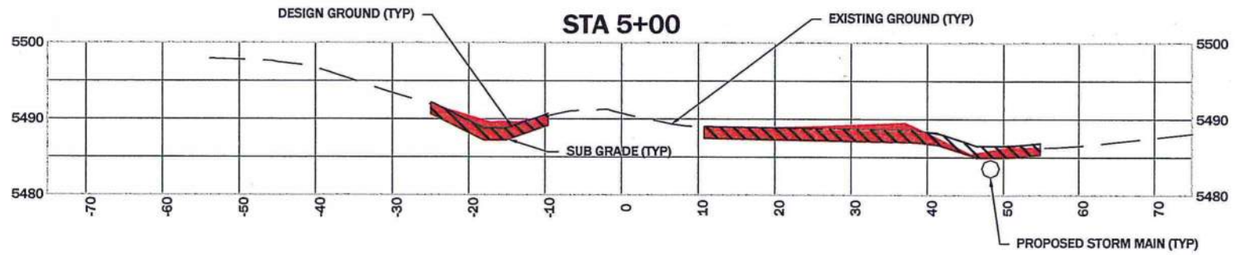
SCALE IN FEET
0 25 50

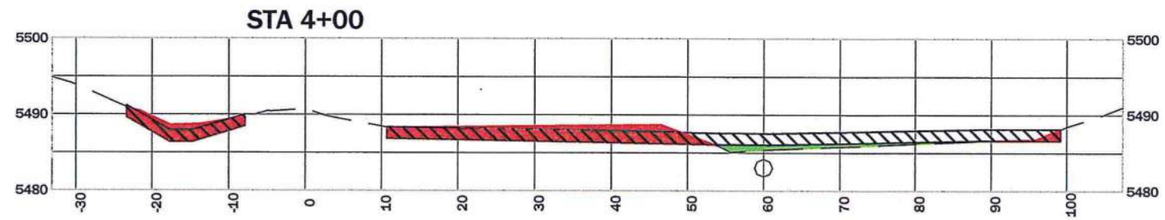
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

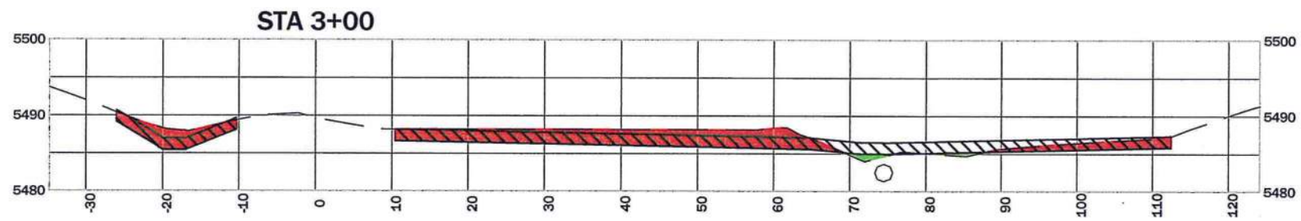
HDPE PIPING
PLAN AND PROFILE
STA 13+00 TO 20+65

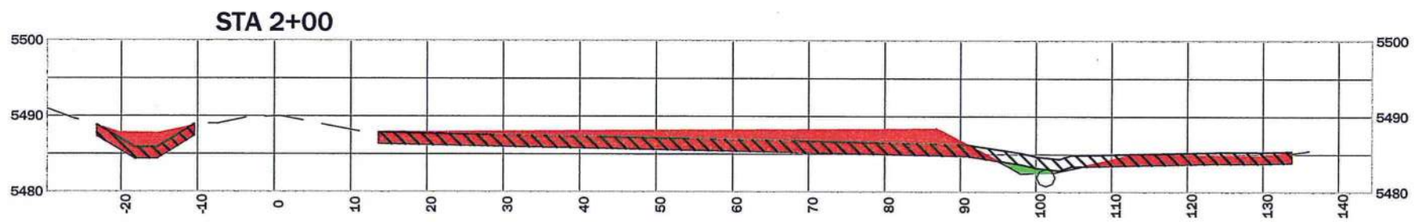
PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

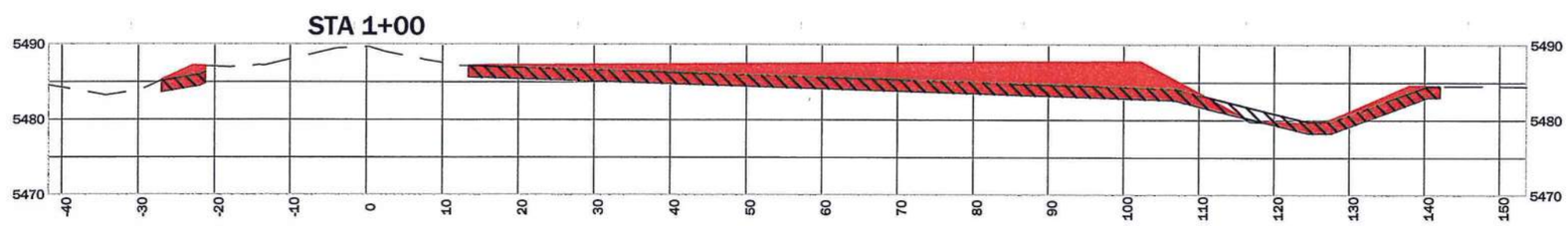
SHEET
29

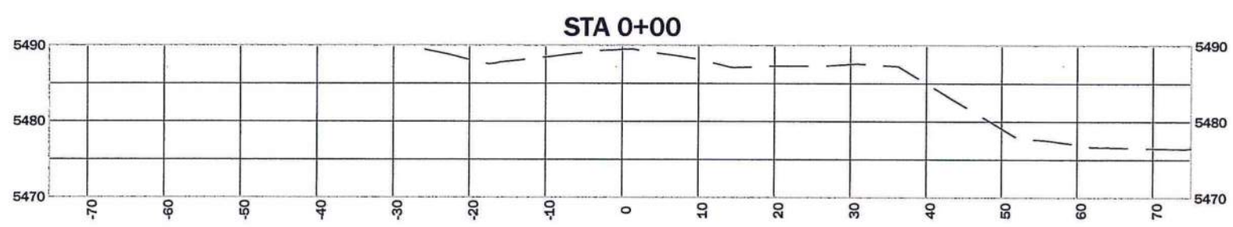












LEGEND

- CUT
- FILL
- 18" BACKFILL

NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

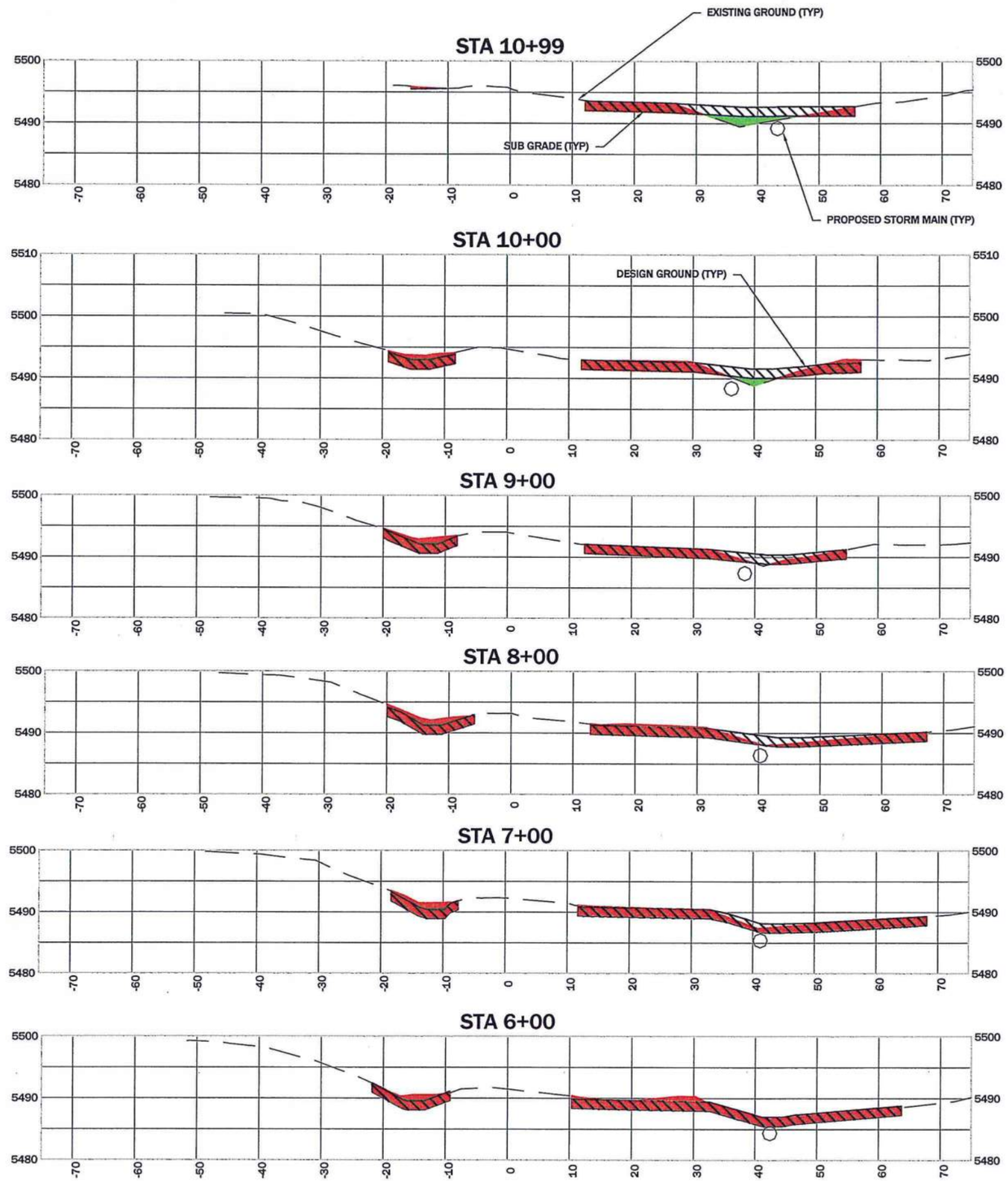
THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

OVERALL SITE CROSS SECTIONS STA 0+00 TO 5+00

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 30

2/28/2014 11:16:14 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-XSF-004-13.DWG



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND

- CUT
- FILL
- 18" BACKFILL

REVISION

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

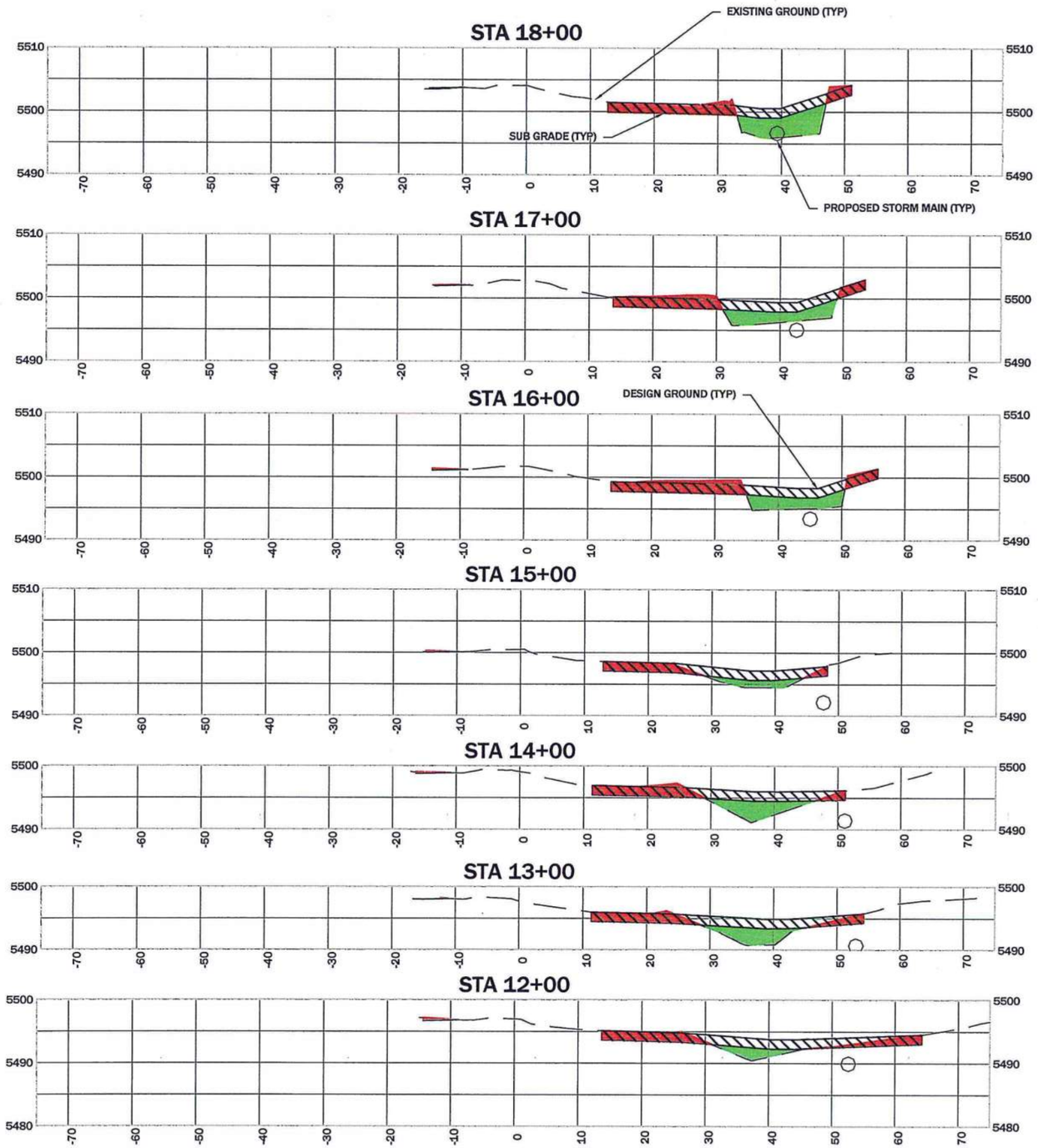
SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

OVERALL SITE CROSS SECTIONS STA 6+00 TO 11+00

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

2/28/2014 11:18:21 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-XSF-004-13.DWG



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND

- CUT
- FILL
- 18" BACKFILL

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

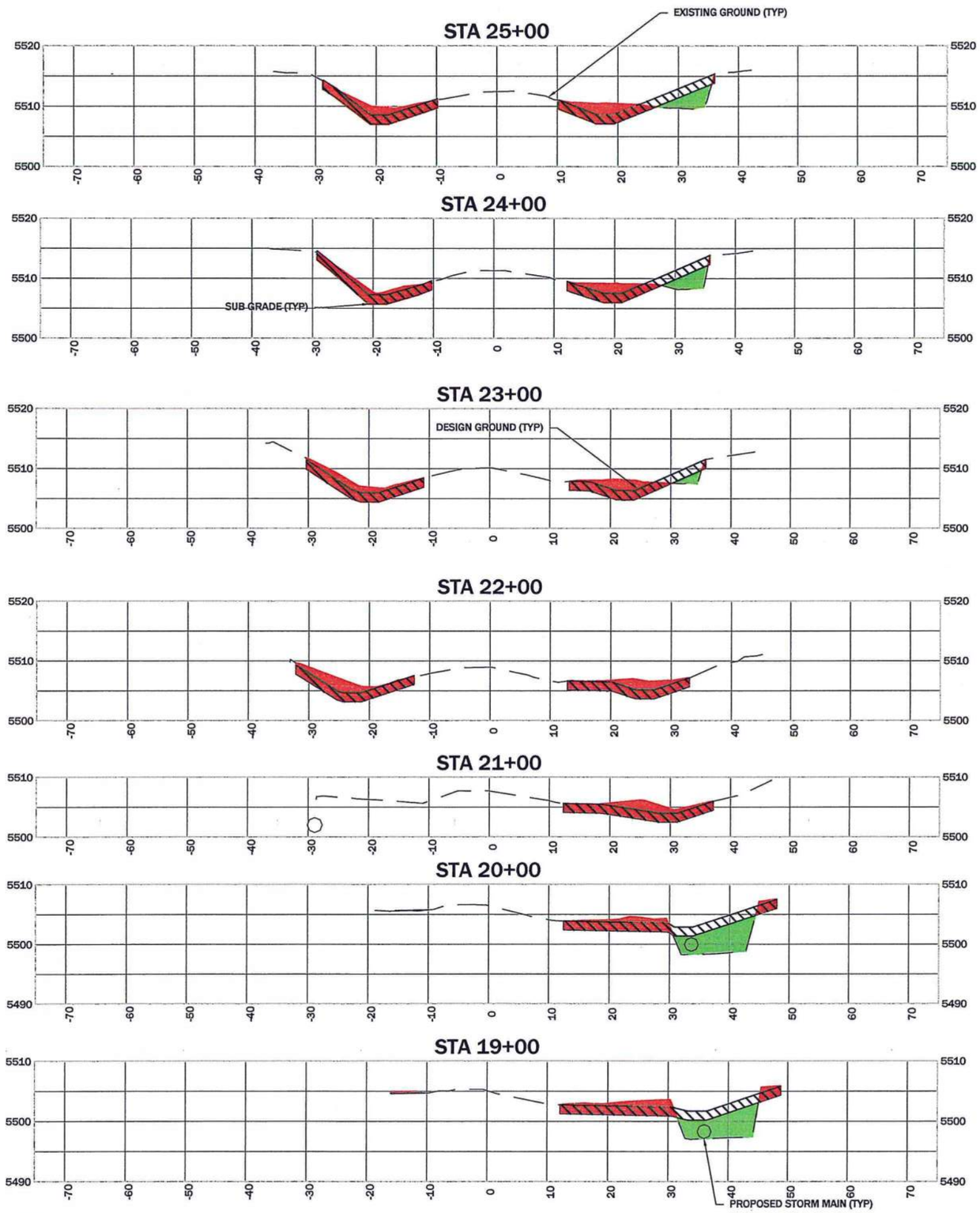
THIRD CYCLE STORM WATER BMPS
CONT ROADSIDE CHANNEL

OVERALL SITE CROSS SECTIONS STA 12+00 TO 18+00

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 32

2/28/2014 11:19:22 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-H20-CO-XSF-004-13.DWG



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND

- CUT
- FILL
- 18" BACKFILL

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

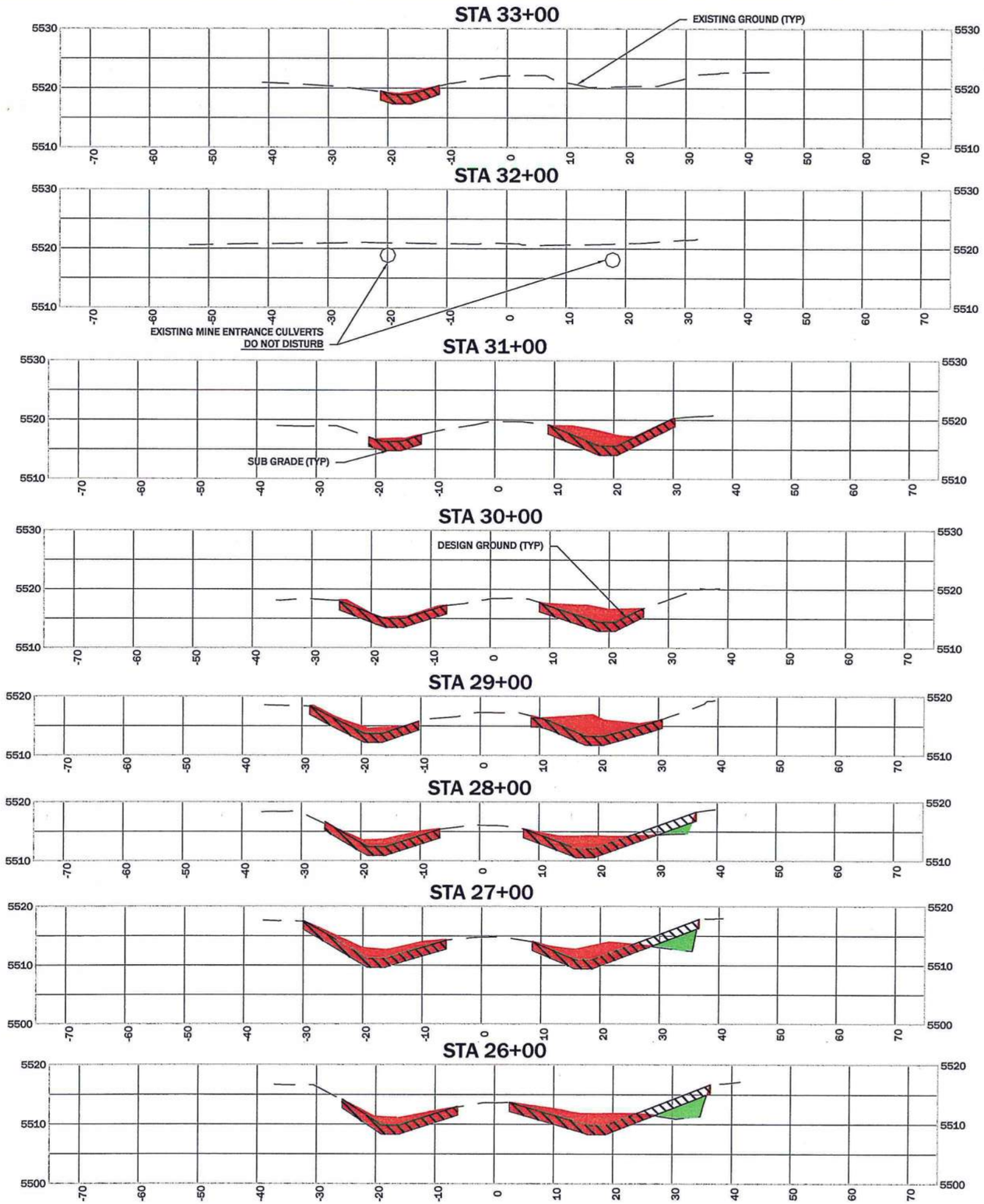
SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

OVERALL SITE CROSS SECTIONS STA 19+00 TO 25+00

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 33



NOTES:

1. IN SECTIONS ABUTTED BY SHEET PILE RETAINING WALLS, TRIM SHEET PILES TO SUBGRADE LEVEL AFTER PIPE SECTION HAS BEEN PLACED TO MAINTAIN SLOPE STABILITY

LEGEND

- CUT
- FILL
- 18" BACKFILL

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CIA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

OVERALL SITE CROSS SECTIONS
STA 26+00 TO 33+00

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
34

Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+00.00	0.00	0.00	0.00	0.00	0.00	0.00
0+50.00	0.00	148.00	0.00	137.03	0.00	137.03
1+00.00	0.54	367.14	0.50	476.98	0.50	614.01
1+50.00	0.00	368.89	0.56	732.70	1.07	1346.71
2+00.00	5.62	251.48	5.20	574.42	6.27	1921.13
2+50.00	20.50	200.38	25.53	430.39	31.80	2351.52
3+00.00	5.34	164.29	27.95	362.16	59.75	2713.68
3+50.00	25.16	115.44	28.24	259.00	88.00	2972.68
4+00.00	14.43	110.83	36.66	209.50	124.65	3182.19
4+50.00	1.82	126.42	15.04	219.67	139.70	3401.86
5+00.00	0.00	95.21	1.85	214.63	141.55	3616.49
5+50.00	0.00	117.28	0.00	196.75	141.55	3813.23
6+00.00	0.00	101.37	0.00	202.45	141.55	4015.69
6+50.00	0.00	84.96	0.00	176.69	141.55	4192.37
7+00.00	0.00	94.64	0.00	166.30	141.55	4358.67
7+50.00	0.00	89.88	0.00	170.85	141.55	4529.53
8+00.00	0.10	91.45	0.09	167.89	141.63	4697.42
8+50.00	0.12	75.93	0.20	154.98	141.84	4852.40
9+00.00	0.53	69.72	0.61	134.86	142.44	4987.27
9+50.00	2.24	65.63	2.57	125.32	145.01	5112.59
10+00.00	5.03	72.52	6.73	127.92	151.74	5240.51
10+50.00	8.22	69.89	12.27	131.86	164.02	5372.37
10+98.57	13.06	31.02	19.14	90.75	183.15	5463.13
11+50.00	11.98	40.37	23.85	67.99	207.00	5531.12
12+00.00	14.35	32.90	22.51	63.55	229.51	5594.67
12+50.00	37.48	34.85	47.99	62.73	277.50	5657.39
13+00.00	26.31	29.09	59.07	59.20	336.57	5716.60
13+50.00	37.07	32.12	57.19	55.76	393.76	5772.36
14+00.00	29.38	30.01	61.53	57.53	455.29	5829.88
14+50.00	17.28	29.52	43.20	55.13	498.49	5885.01
15+00.00	13.99	21.84	28.95	47.56	527.45	5932.57
15+50.00	19.93	58.49	31.41	74.38	558.86	6006.95
16+00.00	30.12	48.37	46.34	98.95	605.20	6105.90
16+50.00	32.68	44.44	58.15	85.94	663.35	6191.84
17+00.00	34.12	38.57	61.85	76.86	725.21	6268.70
17+50.00	29.65	37.69	59.05	70.61	784.26	6339.31
18+00.00	45.08	37.82	69.19	69.92	853.45	6409.23
18+50.00	41.31	40.92	79.98	72.91	933.43	6482.14
19+00.00	48.43	46.45	83.09	80.89	1016.52	6563.03
19+50.00	52.10	37.74	93.08	77.95	1109.60	6640.98
20+00.00	51.76	39.22	96.16	71.25	1205.76	6712.23
20+50.00	4.99	36.98	52.55	70.55	1258.31	6782.78
21+00.00	0.00	51.90	4.62	82.29	1262.93	6865.07
21+50.00	0.00	38.56	0.00	83.75	1262.93	6948.83
22+00.00	0.00	90.19	0.00	119.22	1262.93	7068.04
22+50.00	1.39	78.78	1.28	156.45	1264.22	7224.50
23+00.00	4.78	80.73	5.71	147.69	1269.93	7372.18
23+50.00	8.69	71.31	12.48	140.77	1282.40	7512.96
24+00.00	15.16	69.96	22.09	130.81	1304.49	7643.77
24+50.00	17.12	89.55	29.89	147.70	1334.39	7791.47

Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
25+00.00	17.08	77.41	31.67	154.59	1366.05	7946.06
25+50.00	16.30	95.07	30.90	159.70	1396.96	8105.76
26+00.00	15.95	99.36	29.86	180.03	1426.82	8285.79
26+50.00	17.31	102.45	30.80	186.85	1457.61	8472.64
27+00.00	13.75	105.35	28.76	192.40	1486.37	8665.04
27+50.00	10.96	98.76	22.88	188.98	1509.26	8854.02
28+00.00	4.84	90.29	14.63	175.04	1523.88	9029.07
28+50.00	4.98	88.65	9.09	165.68	1532.98	9194.75
29+00.00	0.00	102.67	4.61	177.14	1537.59	9371.89
29+50.00	0.00	96.17	0.00	184.11	1537.59	9556.00
30+00.00	0.00	81.59	0.00	164.59	1537.59	9720.59
30+50.00	0.00	75.43	0.00	145.39	1537.59	9865.98
31+00.00	0.00	71.02	0.00	135.61	1537.59	10001.58
31+50.00	0.00	79.16	0.00	139.06	1537.59	10140.64
32+00.00	0.00	0.00	0.00	72.64	1537.59	10213.29
32+50.00	0.00	32.66	0.00	28.86	1537.59	10242.15
33+00.00	0.00	17.44	0.00	44.35	1537.59	10286.50
33+50.00	0.00	17.70	0.00	32.53	1537.59	10319.03

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

TOTAL EXCAVATION VOLUME TABLE

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 35

Channel Backfill Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+00.00	0.00	0.00	0.00	0.00	0.00	0.00
0+50.00	121.51	0.00	112.51	0.00	112.51	0.00
1+00.00	201.41	0.00	298.99	0.00	411.50	0.00
1+50.00	201.59	0.00	401.37	0.00	812.87	0.00
2+00.00	199.27	0.00	371.16	0.00	1184.04	0.00
2+50.00	193.76	0.00	377.37	0.00	1561.41	0.00
3+00.00	176.46	0.00	378.56	0.00	1939.96	0.00
3+50.00	172.56	0.00	323.17	0.00	2263.14	0.00
4+00.00	155.85	0.00	304.09	0.00	2567.22	0.00
4+50.00	133.23	0.00	267.67	0.00	2834.89	0.00
5+00.00	89.19	0.00	218.32	0.00	3053.21	0.00
5+50.00	102.08	0.00	177.10	0.00	3230.31	0.00
6+00.00	98.78	0.00	185.98	0.00	3416.29	0.00
6+50.00	87.41	0.00	177.40	0.00	3593.69	0.00
7+00.00	100.73	0.00	174.20	0.00	3767.89	0.00
7+50.00	87.42	0.00	174.21	0.00	3942.11	0.00
8+00.00	102.62	0.00	175.96	0.00	4118.07	0.00
8+50.00	88.59	0.00	177.04	0.00	4295.11	0.00
9+00.00	81.33	0.00	157.33	0.00	4452.44	0.00
9+50.00	87.91	0.00	156.70	0.00	4609.14	0.00
10+00.00	83.84	0.00	159.03	0.00	4768.17	0.00
10+50.00	84.55	0.00	155.91	0.00	4924.09	0.00
10+98.57	65.50	0.00	134.94	0.00	5059.03	0.00
11+50.00	64.76	0.00	124.07	0.00	5183.10	0.00
12+00.00	75.81	0.00	120.48	0.00	5303.58	0.00
12+50.00	77.42	0.00	141.88	0.00	5445.46	0.00
13+00.00	64.35	0.00	131.27	0.00	5576.73	0.00
13+50.00	61.54	0.00	114.08	0.00	5690.81	0.00
14+00.00	59.74	0.00	112.30	0.00	5803.10	0.00
14+50.00	53.69	0.00	105.02	0.00	5908.13	0.00
15+00.00	52.81	0.00	98.61	0.00	6006.74	0.00
15+50.00	67.14	0.00	111.07	0.00	6117.81	0.00
16+00.00	63.00	0.00	120.50	0.00	6238.31	0.00
16+50.00	62.72	0.00	116.41	0.00	6354.71	0.00
17+00.00	59.40	0.00	113.08	0.00	6467.79	0.00
17+50.00	59.15	0.00	109.78	0.00	6577.57	0.00
18+00.00	57.38	0.00	107.90	0.00	6685.46	0.00
18+50.00	55.74	0.00	104.74	0.00	6790.20	0.00
19+00.00	55.06	0.00	102.60	0.00	6892.79	0.00
19+50.00	53.77	0.00	100.77	0.00	6993.56	0.00
20+00.00	53.18	0.00	99.02	0.00	7092.59	0.00
20+50.00	51.01	0.00	96.47	0.00	7189.06	0.00
21+00.00	37.22	0.00	81.69	0.00	7270.75	0.00
21+50.00	29.84	0.00	62.09	0.00	7332.83	0.00
22+00.00	59.46	0.00	82.68	0.00	7415.51	0.00
22+50.00	67.30	0.00	117.37	0.00	7532.88	0.00
23+00.00	62.79	0.00	120.45	0.00	7653.33	0.00
23+50.00	61.35	0.00	114.94	0.00	7768.27	0.00
24+00.00	63.80	0.00	115.88	0.00	7884.15	0.00
24+50.00	75.29	0.00	128.79	0.00	8012.94	0.00

Channel Backfill Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
25+00.00	67.12	0.00	131.86	0.00	8144.80	0.00
25+50.00	77.51	0.00	133.92	0.00	8278.72	0.00
26+00.00	79.80	0.00	145.66	0.00	8424.38	0.00
26+50.00	81.81	0.00	149.64	0.00	8574.02	0.00
27+00.00	78.19	0.00	148.14	0.00	8722.16	0.00
27+50.00	76.12	0.00	142.88	0.00	8865.03	0.00
28+00.00	72.50	0.00	137.61	0.00	9002.64	0.00
28+50.00	71.05	0.00	132.92	0.00	9135.57	0.00
29+00.00	60.48	0.00	121.79	0.00	9257.35	0.00
29+50.00	59.99	0.00	111.54	0.00	9368.90	0.00
30+00.00	53.17	0.00	104.78	0.00	9473.67	0.00
30+50.00	50.81	0.00	96.28	0.00	9569.95	0.00
31+00.00	45.13	0.00	88.83	0.00	9658.78	0.00
31+50.00	54.59	0.00	92.33	0.00	9751.11	0.00
32+00.00	0.00	0.00	50.17	0.00	9801.29	0.00
32+50.00	22.54	0.00	19.95	0.00	9821.23	0.00
33+00.00	14.75	0.00	33.05	0.00	9854.29	0.00
33+50.00	13.06	0.00	25.75	0.00	9880.04	0.00

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: AJB
APPROVED BY: LJD
PROJECT NO:
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

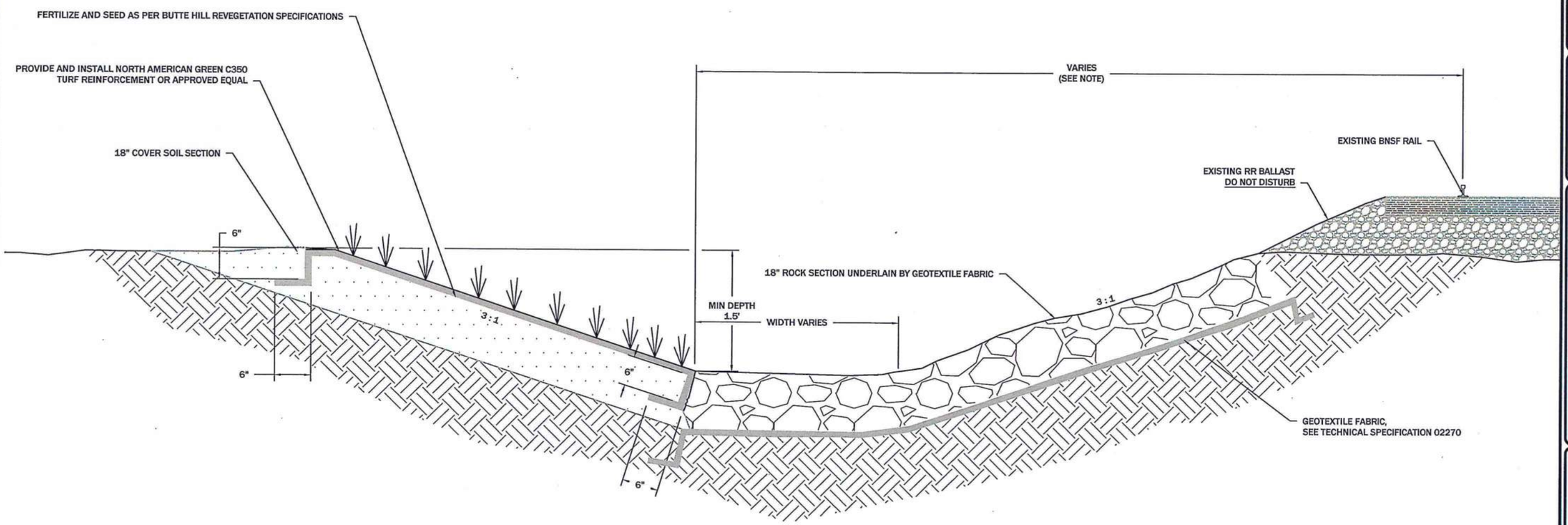
SCALE IN FEET
0 10 20

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

TOTAL BACKFILL VOLUME TABLE

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET
36



COMBINATION CHANNEL DETAIL (1)

NOT TO SCALE

DETAIL STATIONING

SOUTH CHANNEL STA 21+26 TO STA 32+00
NORTHWEST CHANNEL STA 0+00 TO STA 9+60
NORTHEAST CHANNEL STA 0+00 TO STA 9+91
STA 10+52 TO STA 11+93

NOTE:
ADJUST ROCK SECTION WIDTH AS REQUIRED TO MAINTAIN 25' BUFFER FROM RR CL.

REVISIONS
DATE: BY: DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MCB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE:

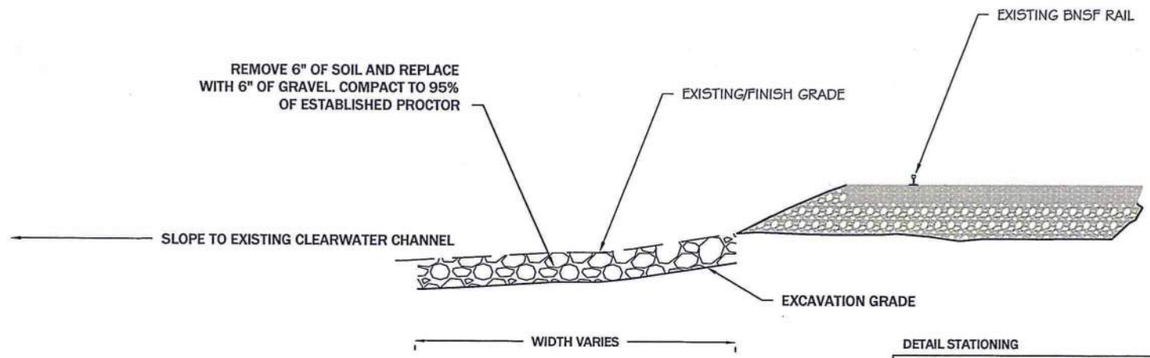
SCALE IN FEET
0

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

COMBINATION CHANNEL DETAIL

PIONEER TECHNICAL SERVICES, INC
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 37



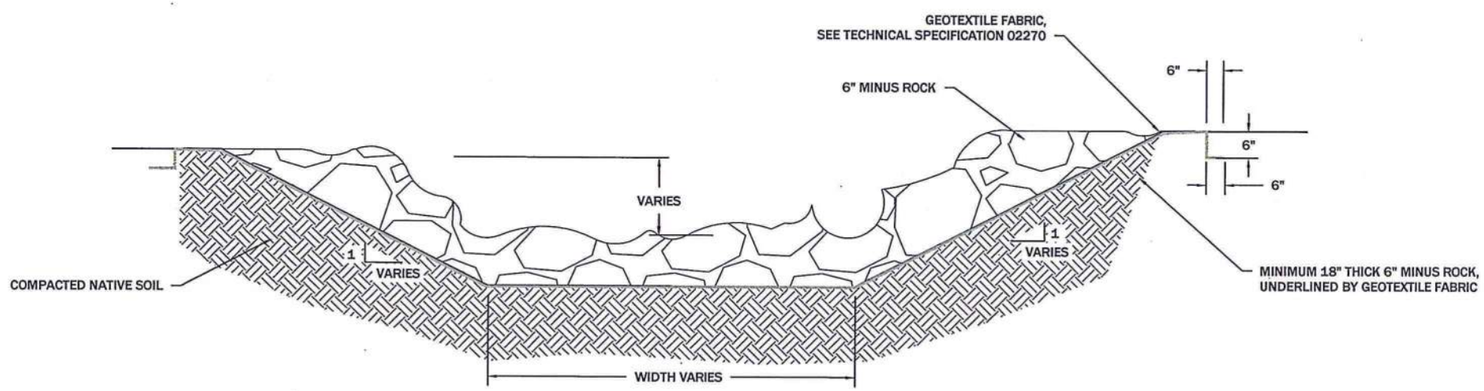
DETAIL STATIONING

NORTHWEST CHANNEL STA 9+60 TO STA 20+78

6" GRAVEL SECTION DETAIL

N.T.S.

2



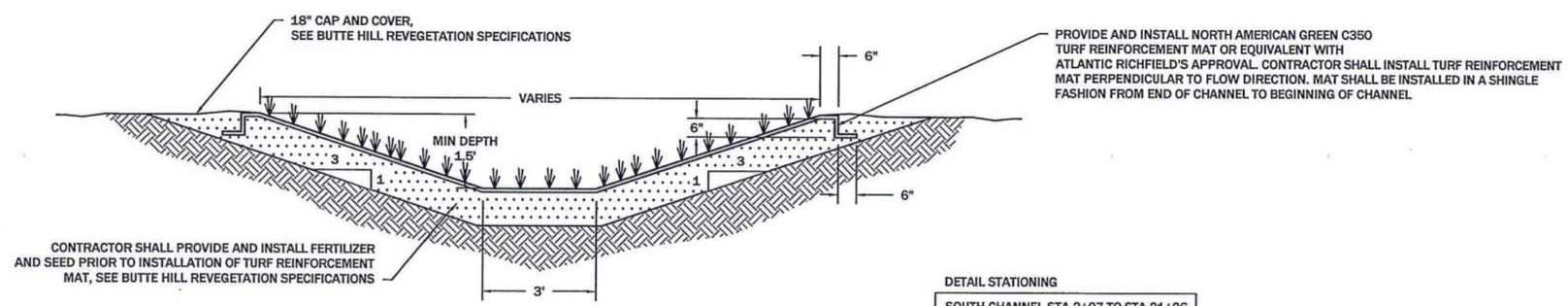
DETAIL STATIONING

SOUTH CHANNEL STA 0+37 TO STA 2+07

RIPRAP CHANNEL DETAIL

N.T.S.

3



DETAIL STATIONING

SOUTH CHANNEL STA 2+07 TO STA 21+26

GRASS-LINED CHANNEL DETAIL

N.T.S.

4

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LWD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE: NA
DATUM: NA
UNITS: IF
SOURCE: PIONEER

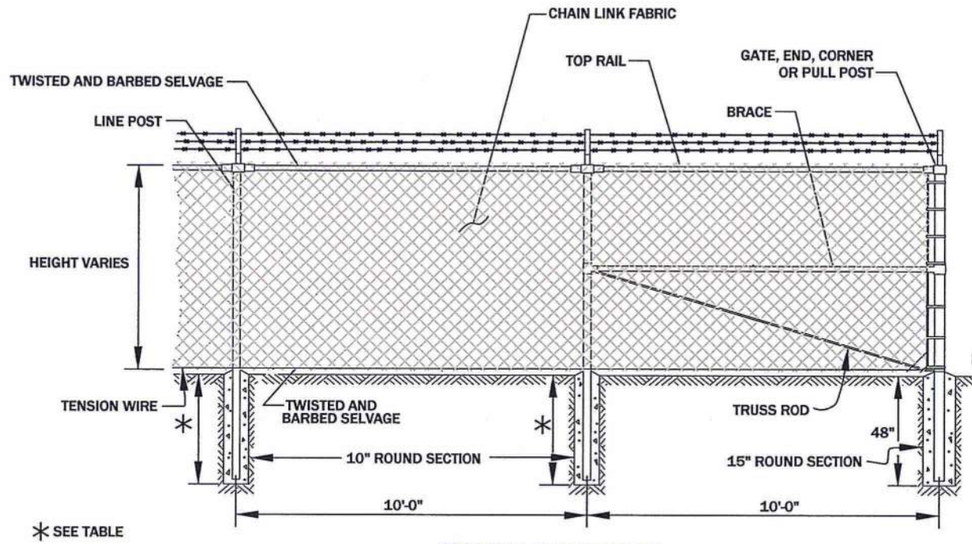
SCALE IN FEET
0 NTS

THIRD CYCLE STORM WATER BMPS
CONT ROADSIDE CHANNEL

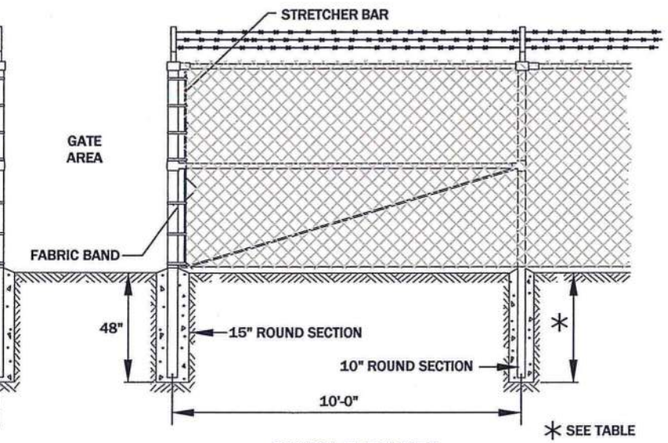
CONTINENTAL ROADSIDE CHANNEL DETAILS

PIONEER TECHNICAL SERVICES, INC
1101 S MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

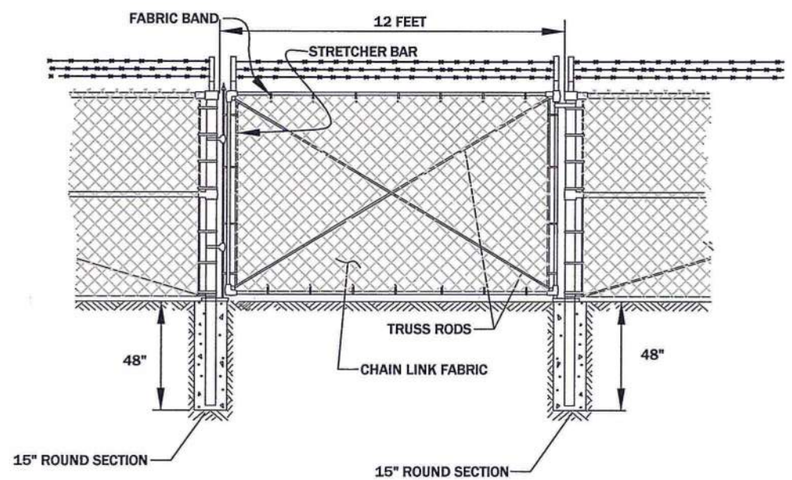
SHEET 38



CHAIN LINK FENCE



SINGLE PANEL



GATE

NOTES:
1. SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. INSTALL FENCING BETWEEN EXISTING RR OVERPASS ABUTMENTS (APPROX 55 LF).
3. ADJUST AS REQUIRED AGAINST ABUTMENTS TO ENSURE FENCE IS SUFFICIENT TO DISSUADE TRESPASSING.
4. INSTALL DOUBLE PANELS AT 300' MAXIMUM SPACING AND AT ALL FENCE CORNERS WITH DEFLECTION ANGLES GREATER THAN 10°.
5. PULL POST BRACING IS THE SAME AS CORNER BRACING.
6. ALL CONCRETE IS M-3000 CLASS "C" OR BETTER.

HEIGHT OF FABRIC	WIRE FABRIC ABOVE GROUND	DEPTH OF CONCRETE *	DEPTH OF POST IN CONCRETE (MIN.)
6'	1"-2"	36"	32"
8'	1"-2"	36"	32"

PANEL AND CORNER FENCING DETAIL (1)

NOT TO SCALE

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CLA
DESIGNED BY: LJD
CHECKED BY: MJB
APPROVED BY: LJD
PROJECT NO: 267566
DATE: 10-1-2013

DISPLAYED AS:
COORD SYS/ZONE:
DATUM:
UNITS:
SOURCE: PIONEER

SCALE IN FEET
0 NTS

THIRD CYCLE STORM WATER BMP'S
CONT ROADSIDE CHANNEL

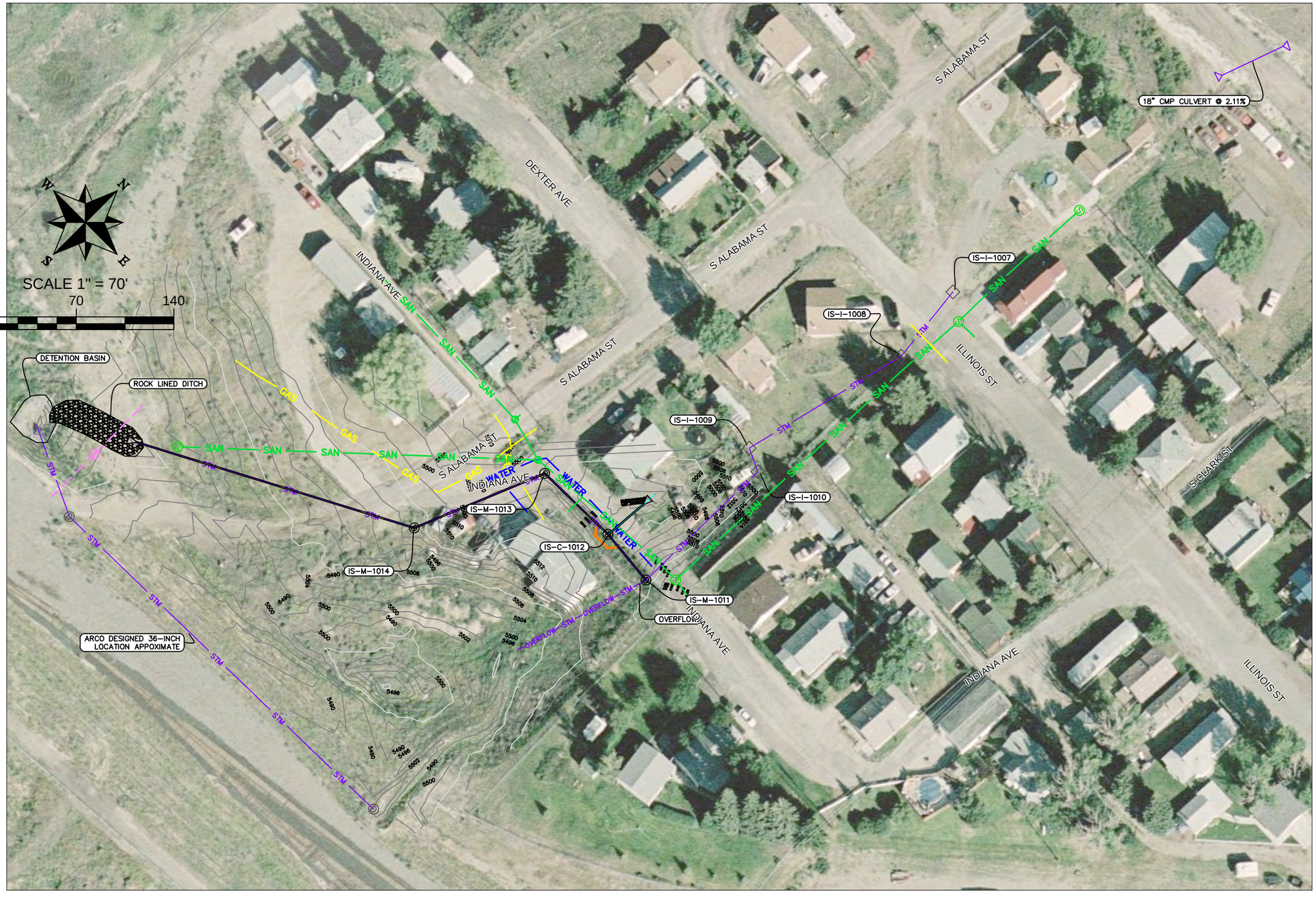
CHAIN LINK FENCE DETAILS

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

SHEET 39

2/28/2014 11:25:39 AM P:\ARCO\BUTTE\BPSOU\2013\CLEARWATER DITCH\DRAWINGS\CO\CLR-CO-DET-001-13.DWG

DEXTER ADDITION
STORM SEWER AS-BUILT PLAN
SITE MAP



LEGEND

- As-Built Storm Sewer
- Storm Manhole
- Sanitary Manhole
- Drop Inlet
- SAN — Sanitary Sewer
- GAS — Gas Line
- WATER — Water Line
- New Retaining Wall
- West Camp Water
- STM — Existing Storm Sewer
- As-Built Rock Lined Ditch
- As-Built Valley Gutter

No.	Revision/Issue	Date

BUTTE-SILVER BOW
5-2-77
THE RICHEST HILL ON EARTH
STATE OF MONTANA

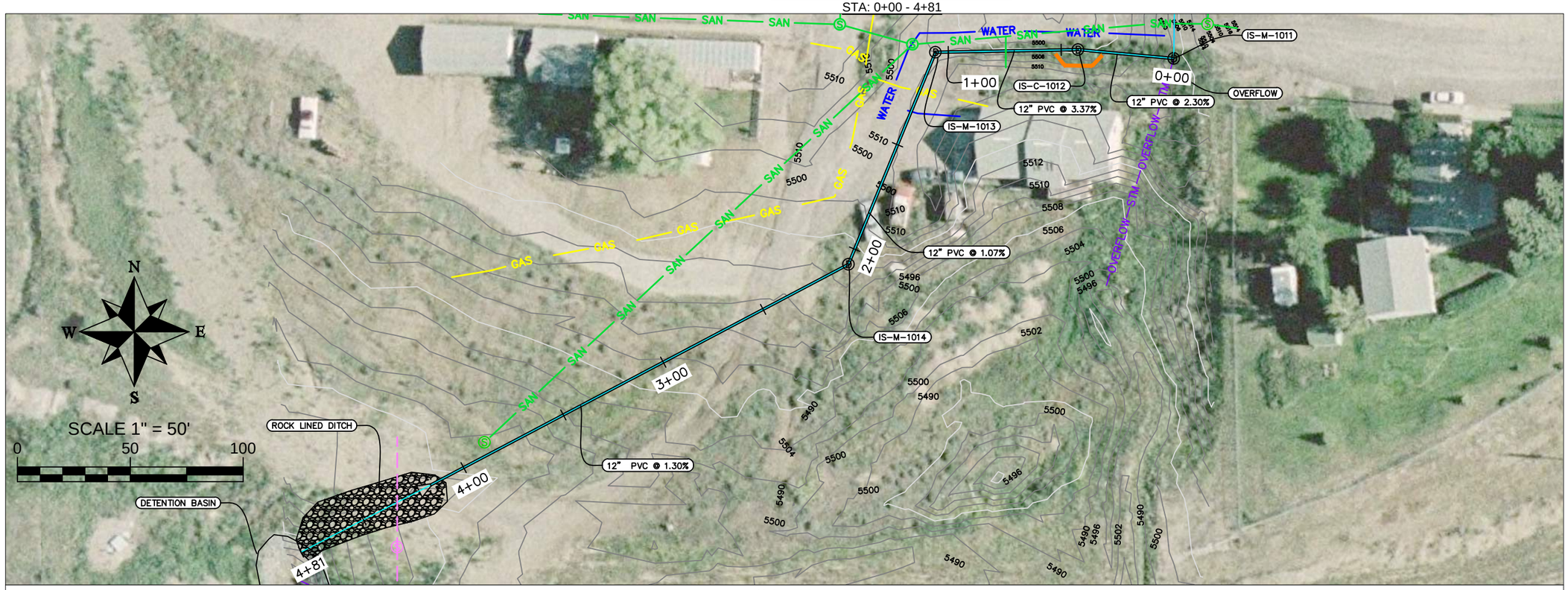
WATER & ENVIRONMENTAL TECHNOLOGIES, PC

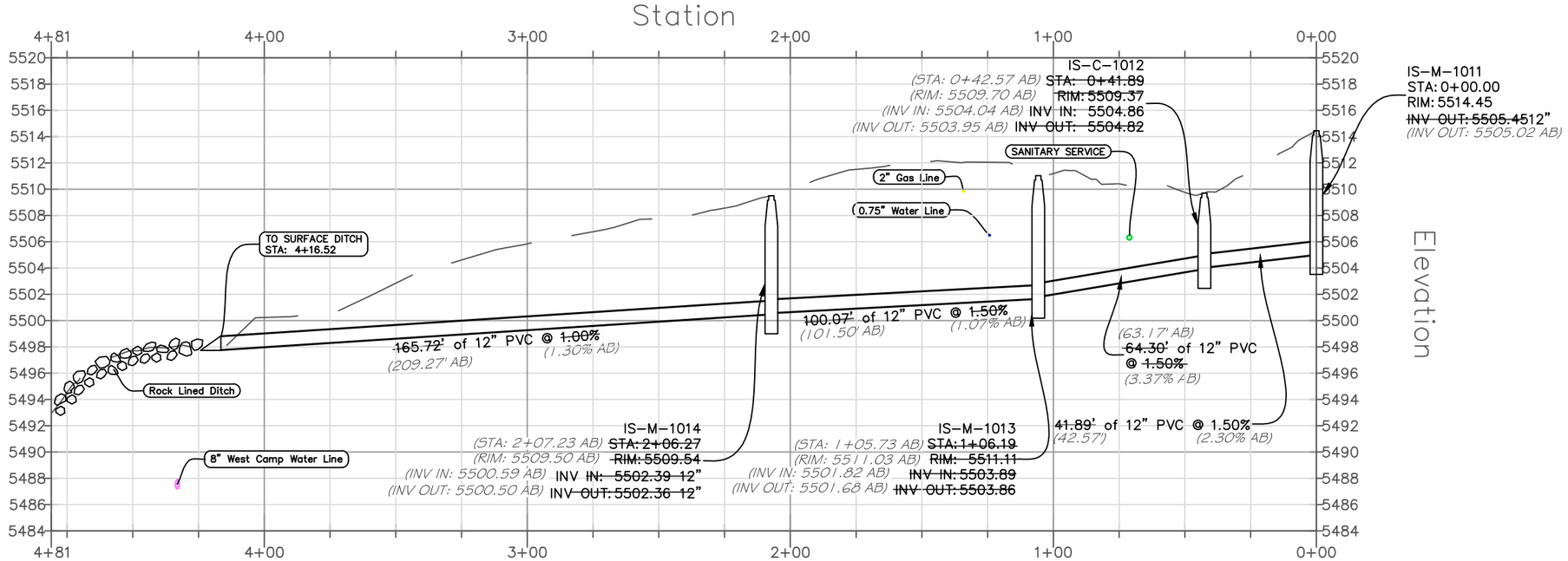
480 E. Park Street
Suite 200
Butte, MT 59701
(406)-782-5220

Dexter Addition
SITE LOCATION
Butte, MT

BSBPWM38	Sheet
6/11/2013	C-1AB
As Noted	

DEXTER ADDITION
STORM SEWER AS-BUILT PLAN
STA: 0+00 - 4+81





STORM SEWER AS-BUILT PROFILE
STA: 0+00 - 4+81
SCALE: 1" = 50' HORZ
SCALE: 1" = 5' VERT

LEGEND

- As-Built Storm Sewer
- Storm Manhole
- Sanitary Manhole
- SAN — Sanitary Sewer
- OVERFLOW — SW — Overflow Storm Sewer
- GAS — Gas Line
- WATER — Water Line
- Retaining Wall
- West Camp Water
- STM — Storm Sewer
- Rock Lined Ditch

No.	Revision/Issue	Date

BUTTE-SILVER BOW — 5-2-77 — THE RICHEST HILL ON EARTH — STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

480 E. Park Street
Suite 200
Butte, MT 59701
(406)-782-5220

Dexter Addition
Storm Water As-Built
PLAN & PROFILE
Butte, MT

BSBPWM38	Sheet
5/21/2013	P-1AB
As Noted	

M:\BSBPWM38\CAD\Dexter_Storm_As-Built.dwg, BSB Plan & Profile, 5/21/2013 11:06:35 AM

Design Report
for
Railroad Yard Stormwater Improvements – 2007
Butte, Montana
Lower Yard Drainage Areas 2 and 3

This report addresses runoff from Drainage Area 2 of the Lower Railroad Yard and Drainage Area 3 (combination of areas 3A and 3B) up-gradient of the Lower Railroad Yard in Butte, Montana. Drainage Areas 2 and 3 are identified on Sheet P-1. Runoff from Drainage Area 2 is constrained by the rails and by the soil berm constructed in 2001 adjacent to Railroad Street. This runoff flows to the west to Kaw Avenue. An existing storm drain inlet between the tracks just east of Kaw is only partially effective at capturing this runoff. Runoff from Drainage Area 3 is constrained by the Lower Yard itself, which is elevated with respect to this up-gradient drainage area. The constrained runoff from Drainage Area 3 flows west to Kaw Avenue to be captured by the existing storm drain inlet in the southwest corner of Triple S' parking lot. This inlet drains to a 48-inch drain under Kaw Avenue and discharges to an open ditch on the west side of Kaw, which eventually drains to the Metro Storm Drain system.

Drainage Area 2

Stormwater improvements to this area consist of cleaning the existing storm drain inlet and associated storm drain piping at Kaw Avenue. A second storm drain inlet will be installed to increase the runoff capture capacity of the system. Additionally, the area will be graded to convey runoff to the storm drain inlets, and perforated cross-track drain pipes will be installed to convey runoff between sets of tracks to the storm drains and to capture runoff flowing between the rails. Finally, a 6-inch Type 3 rock cap will be installed outside the ends of the ties. These improvements to Drainage Area 2 are shown on Sheet P-2. The capacity of the existing storm drain system to handle runoff from Drainage Area 2 is discussed under Drainage Area 3 below.

Drainage Area 3

Stormwater improvements to this area consist of constructing a stormwater basin to retain runoff from the 25-year, 24-hour storm event. The stormwater basin is equipped with an overflow structure that discharges to a new drain pipe that connects to the existing storm drain system at Kaw Avenue. These stormwater improvements are shown on Sheets P-2, P-3 and P-4.

The retention basin will be located at the most down-gradient location available on railroad property within the drainage basin. Placing the basin farther west would interfere with long-established non-railroad commercial activities. Based on the retention basin location, the drainage basin was divided into Drainage Area 3A, up-gradient of the retention basin, and Drainage Area 3B, down-gradient of the retention basin. The retention basin was designed to store the 25-year, 24-hour runoff volume from Drainage Area 3A. Additionally, the retention basin overflow structure and associated overflow piping were designed to handle peak runoff from the 100-year, 24-hour design storm

event. The SCS Curve Number Method (TR-55 Method), developed by the U.S. Soil Conservation Service (SCS), was used to calculate peak discharge rates and runoff volumes from Lower Yard Drainage Area 3A. A curve number of 85 was used for Drainage Area 3A. The 100-year, 24-hour peak runoff from Drainage Area 3A is 8.6 cubic feet per second, and the 25-year, 24-hour runoff volume is 17,050 cubic feet. Hydrology and hydraulic design calculations are attached.

Review of Sheets P-1 and P-2 indicates that the existing 21-inch storm drain piping at Kaw Avenue is being called upon to convey runoff from Drainage Areas 2 and 3A. The existing 21-inch storm drain was analyzed and found to be capable of handling the combined 100-year, 24-hour peak flow of 11.6 cubic feet per second from these drainage areas. Hydraulic calculations are attached.

Attachments:

- Hydrology calculations for Drainage Areas 2, 3A and 3B
- Retention basin overflow riser capacity calculations
- Retention basin overflow piping capacity calculations
- Existing 21-inch storm drain capacity calculations

Worksheet 4: Graphical Peak Discharge method

Project Lower Yard By SL Date 2/3/07

Location Lower Yard - Drainage Area 2 Checked EJ Date 2/3/07

Circle one: (Present) Developed

1. Data:

$\frac{1.53 ac}{640} = .0024 mi^2$

Drainage area ..... A_m = 0.0024 mi^2 (acres/640)

Runoff curve number .... CN = 85 (From worksheet 2)

Time of concentration .. T_c = 0.017 hr (From worksheet 3)

Rainfall distribution type = II (I, IA, II, III)

Pond and swamp areas spread throughout watershed ..... = Ø percent of A_m (____ acres or mi^2 covered)

		Storm #1	Storm #2	Storm #3
2. Frequency	yr	25	50	100
3. Rainfall, P (24-hour)	in	2.2	2.6	2.8
4. Initial abstraction, I_a ..... (Use CN with table 4-1.)	in	0.353	0.353	0.353
5. Compute I_a/P		0.160	0.136	0.126
6. Unit peak discharge, q_u ..... (Use T_c and I_a/P with exhibit 4-11)	csm/in	790	795	800
7. Runoff, Q ..... (From worksheet 2).	in	0.947	1.26	1.42
8. Pond and swamp adjustment factor, F_p .... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)		1	1	1
9. Peak discharge, q_p ..... (Where $q_p = q_u A_m Q F_p$)	cfs	1.80	2.41	2.73

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Lower Yard By SL Date 2/3/07

Location Drainage Area 2 Checked EJ Date 2/3/07

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

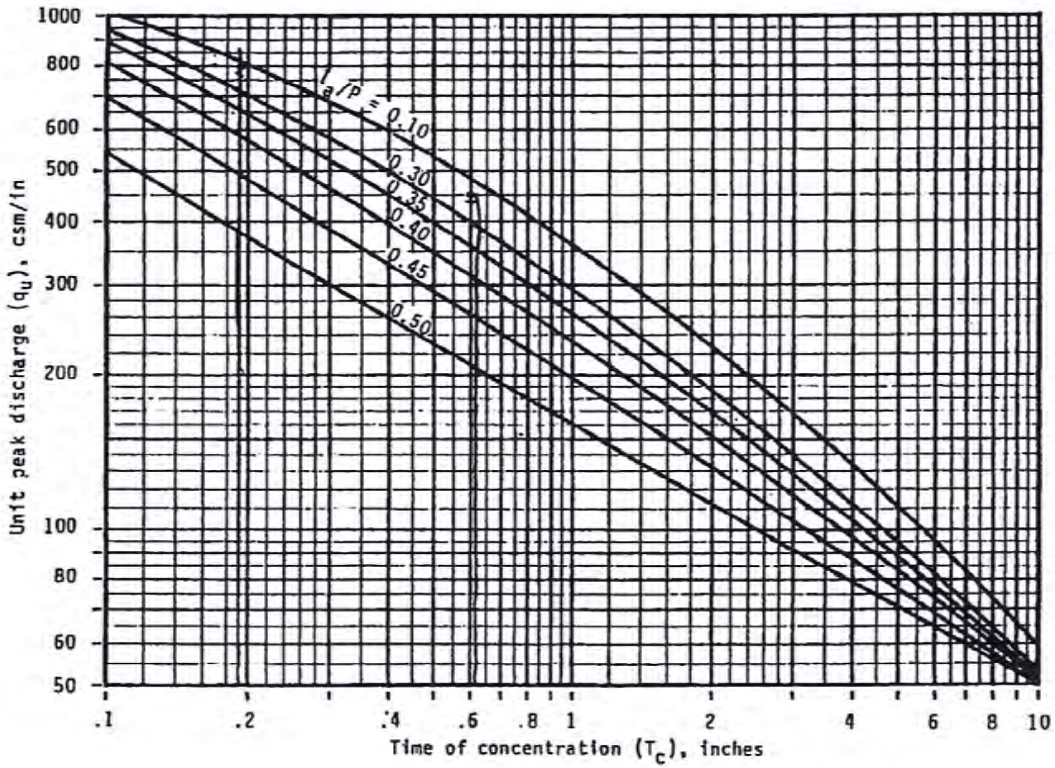
Sheet flow (Applicable to T_c only)	Segment ID			
1. Surface description (table 3-1)		Smooth Surface		
2. Manning's roughness coeff., n (table 3-1) ..		0.011		
3. Flow length, L (total L ≤ 300 ft)	ft	300		
4. Two-yr 24-hr rainfall, P_2	in	1.2		
5. Land slope, s	ft/ft	0.00167	$\frac{5471-5464}{300}$	
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	0.12 +	0	= 0.12

Shallow concentrated flow	Segment ID			
7. Surface description (paved or unpaved)		unpaved		
8. Flow length, L	ft	450		
9. Watercourse slope, s	ft/ft	0.014	$\frac{5469-5464}{348.08}$	
10. Average velocity, V (figure 3-1)	ft/s	1.9		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	0.05 +	0	= 0.07

Channel flow	Segment ID			
12. Cross sectional flow area, a	ft^2			
13. Wetted perimeter, p_w	ft			
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s			
18. Flow length, L	ft			
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	+		=

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 0.19

Exhibit 4-II: Unit peak discharge (q_u) for SCS type II rainfall distribution



Worksheet 4: Graphical Peak Discharge method

Project LOWER YARD By SL Date 10MAY07

Location DRAINAGE AREA 3A Checked EJ Date 5/10/07

Circle one: (Present) Developed

1. Data:

Drainage area ..... A_m = 0.0082 mi^2 (acres/640) 5.24 acres/640 = 0.0082 mi^2

Runoff curve number .... CN = 85 (From worksheet 2)

Time of concentration .. T_c = 0.19 hr (From worksheet 3)

Rainfall distribution type = II (I, IA, II, III)

Pond and swamp areas spread throughout watershed ..... = 0 percent of A_m (____ acres or mi^2 covered)

		Storm #1	Storm #2	Storm #3
2. Frequency	yr	25	50	100
3. Rainfall, P (24-hour)	in	2.2	2.6	2.8
4. Initial abstraction, I_a ..... (Use CN with table 4-1.)	in	0.353	0.353	0.353
5. Compute I_a/P		0.160	0.136	0.126
6. Unit peak discharge, q_u ..... (Use T_c and I_a/P with exhibit 4-II)	csm/in	745	755	760
7. Runoff, Q ..... (From worksheet 2). $\frac{(P-0.2S)^2}{P+0.8S}$	in	0.947	1.26	1.42
8. Pond and swamp adjustment factor, F_p .... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)		1	1	1
9. Peak discharge, q_p ..... (Where $q_p = q_u A_m Q F_p$)	cfs	5.79	7.80	8.85

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project LOWER YARD By SL Date 10MAY07

Location DRAINAGE AREA 3A Checked EJ Date 5/10/07

Circle one: (Present) Developed

Circle one: (T_c) T_t through subarea

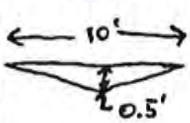
NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)		Smooth				
2. Manning's roughness coeff., n (table 3-1) ..		0.011				
3. Flow length, L (total L ≤ 300 ft)	ft	300				
4. Two-yr 24-hr rainfall, P_2	in	1.2				
5. Land slope, s	ft/ft	0.013	$\frac{5484-5481}{300}$			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	0.09	+		=	0.09

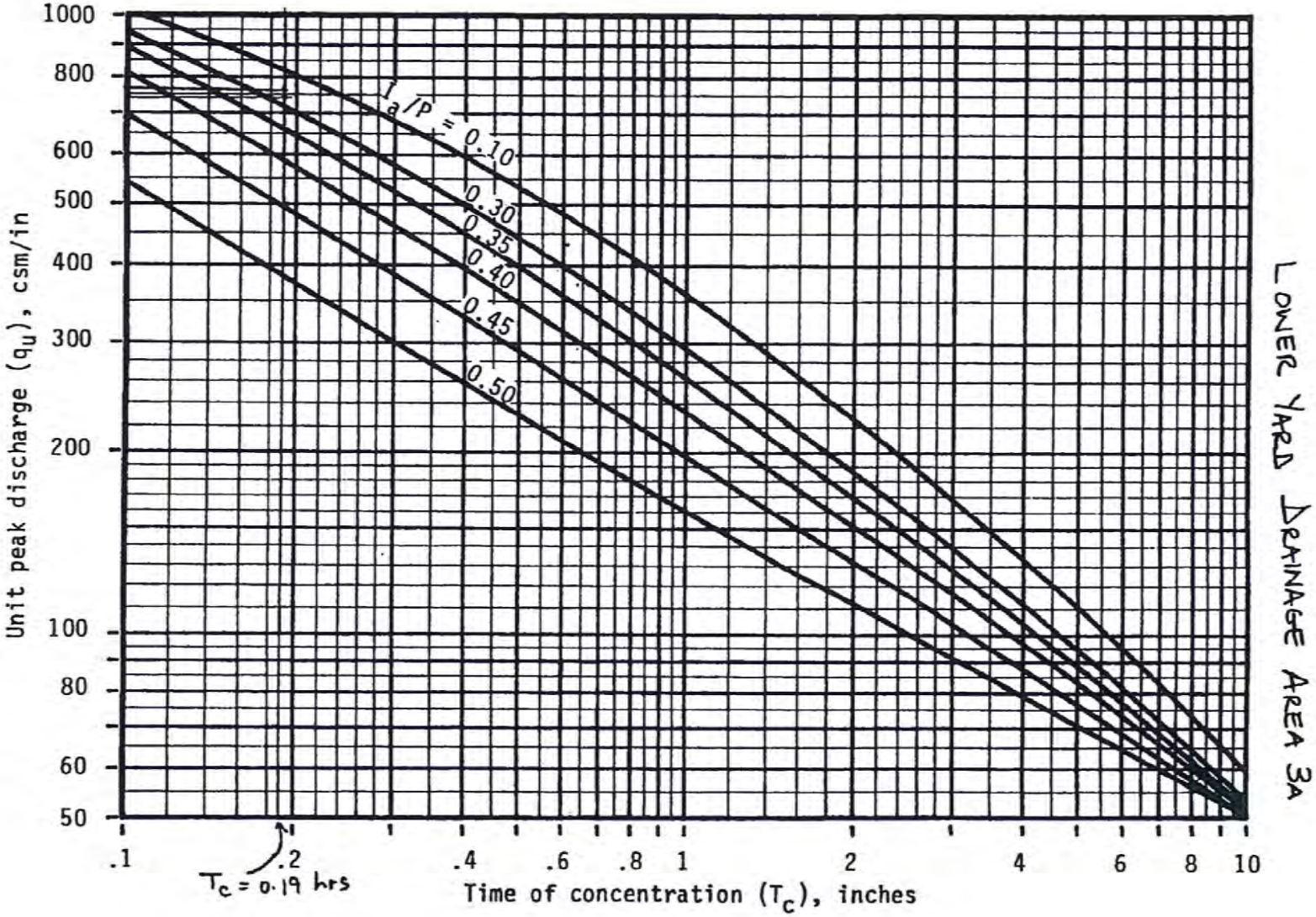
Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)		unpaved				
8. Flow length, L	ft	500				
9. Watercourse slope, s	ft/ft	0.016	$\frac{5484-5476}{2}$			
10. Average velocity, V (figure 3-1)	ft/s	2.0				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	0.07	+		=	0.07

Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2	2.5				
13. Wetted perimeter, p_w	ft	10				
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft	0.25				
15. Channel slope, s	ft/ft	0.012	$\frac{5476-5470}{500}$			
16. Manning's roughness coeff., n		0.015				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	4.3				
18. Flow length, L	ft	500				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	0.03	+		=	0.03



20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 0.19

Exhibit 4-II: Unit peak discharge (q_u) for SCS type II rainfall distribution



LOWER YARD DRAINAGE AREA 3A

Worksheet 4: Graphical Peak Discharge method

Project LOWER YARD By SL Date 10 MAY 07

Location DRAINAGE BASIN 3B Checked EJ Date 5/10/07

Circle one: (Present) Developed

1. Data:

Drainage area ..... A_m = 0.004 mi^2 (acres/640) 2.49/640 = 0.004 mi²

Runoff curve number .... CN = 85 (From worksheet 2)

Time of concentration .. T_c = 0.16 hr (From worksheet 3)

Rainfall distribution type = II (I, IA, II, III)

Pond and swamp areas spread throughout watershed ..... = 0 percent of A_m (____ acres or mi^2 covered)

		Storm #1	Storm #2	Storm #3
2. Frequency	yr	25	50	100
3. Rainfall, P (24-hour)	in	2.2	2.6	2.8
4. Initial abstraction, I_a ..... (Use CN with table 4-1.)	in	0.353	0.353	0.353
5. Compute I_a/P		0.160	0.136	0.126
6. Unit peak discharge, q_u ..... (Use T_c and I_a/P with exhibit 4-II)	csm/in	835	845	850
7. Runoff, Q ..... (From worksheet 2).	in	0.947	1.26	1.42
8. Pond and swamp adjustment factor, F_p .... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)		1	1	1
9. Peak discharge, q_p ..... (Where $q_p = q_u A_m Q F_p$)	cfs	3.16	4.26	4.83

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project LOWER YARD By SL Date 10MAY07

Location DRAINAGE BASIN 3B Checked EJ Date 5/10/07

Circle one: Present Developed

Circle one: T_c T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

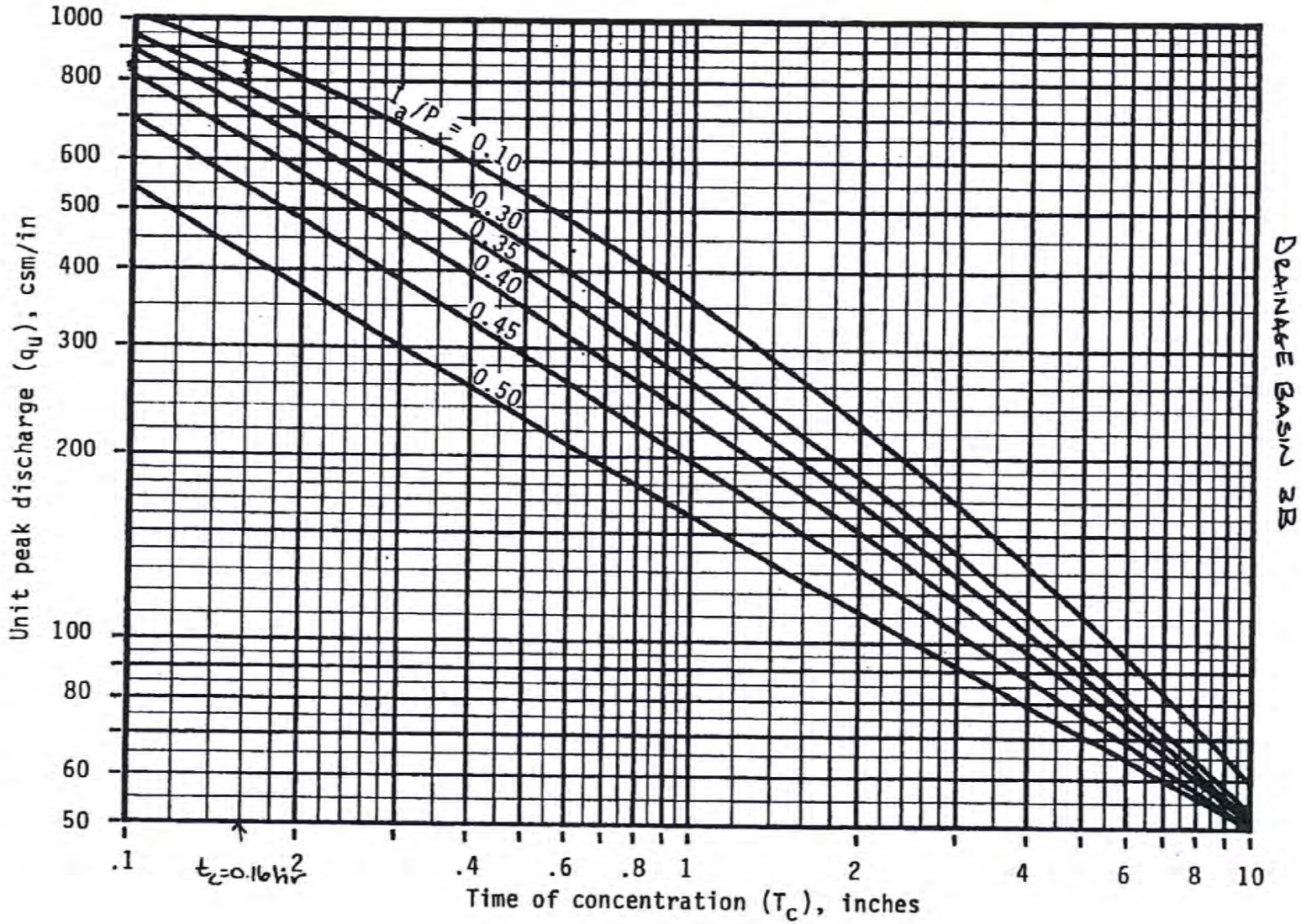
Sheet flow (Applicable to T_c only)		Segment ID			
1. Surface description (table 3-1)		SMOOTH			
2. Manning's roughness coeff., n (table 3-1) ..		0.011			
3. Flow length, L (total L $\leq$ 300 ft)	ft	300			
4. Two-yr 24-hr rainfall, P_2	in	1.2			
5. Land slope, s	ft/ft	0.013	$\frac{5470-5466}{300}$		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	0.09	+		= 0.09

Shallow concentrated flow		Segment ID			
7. Surface description (paved or unpaved)		UNPAVED			
8. Flow length, L	ft	400			
9. Watercourse slope, s	ft/ft	0.01	$\frac{5466-5462}{400}$		
10. Average velocity, V (figure 3-1)	ft/s	1.6			
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	0.07	+		= 0.07

Channel flow		Segment ID			
12. Cross sectional flow area, a	ft^2				
13. Wetted perimeter, p_w	ft				
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s				
18. Flow length, L	ft				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr		+		= 0

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr 0.16

Exhibit 4-II: Unit peak discharge (q_u) for SCS type II rainfall distribution



LEGEND:

- GIS RAILROAD
- GIS EXISTING GROUND COUNTOUR
- SURVEYED EXISTING GROUND CONTOUR
- GIS WATER MAIN (NOT VERIFIED)
- GIS STORM DRAIN (NOT VERIFIED)
- STORM DRAIN INLET
- EXISTING FENCE

DRAINAGE AREA 1
AREA = 11.07 ACRES
25-YR RUNOFF VOL. = 0.87 AC-FT
25-YR PEAK FLOW = 8.5 CFS

DRAINAGE AREA 3A
AREA = 5.24 ACRES
25-YR RUNOFF VOL. = 0.41 AC-FT
25-YR PEAK FLOW = 5.79 CFS

EXISTING STORM DRAIN INLET

EXISTING CROSS-TRACK STORM DRAIN INTERCEPTOR PER RFI 2007-1 AND RFI 2007-7

Sedimentation Basin retains up to the 25-year storm from Drainage Area 3A before discharging to the Kaw Avenue Inlet

DRAINAGE AREA 3B
AREA = 2.49 ACRES
25-YR RUNOFF VOL. = 0.20 AC-FT
25-YR PEAK FLOW = 3.16 CFS

DRAINAGE AREA 4
AREA = 2.55 ACRES
25-YR RUNOFF VOL. = 0.20 AC-FT
25-YR PEAK FLOW = 3.79 CFS

EXISTING STORM DRAIN INLET (CAPPED WITH STEEL PLATE DURING 2001 TCRA CONSTRUCTION)

STORM DRAIN OUTFALL

MAINLINE
TRACK B
TRACK C
TRACK D
TRACK E

DRAINAGE AREA 2
AREA = 1.53 ACRES
25-YR RUNOFF VOL. = 5,554 CU. FT.
25-YR PEAK FLOW = 1.80 CFS

Kaw Avenue Inlet receives Drainage Areas 2, 3A, 3B and 4
Total Area = 11.81 Acres
Combined 25-Yr runoff volume = 0.94 acre-feet
Combined 25-year peak flow = 14.54 cfs

48" CONC CULVERT

OPEN DITCH TO METRO STORM DRAIN

2ND STREET
1ST STREET
MAIN STREET
MISSOURI AVENUE
IOWA AVENUE
MARYLAND AVENUE
CALIFORNIA AVENUE
NEVADA AVENUE
WYOMING AVENUE
UTAH AVENUE
ARIZONA AVENUE
FRONT STREET
KAW AVENUE
RAILROAD STREET
CASEY STREET
SEDIMENTATION POND
DITCH 1
DITCH 2
OPEN DITCH
METRO STORM DRAIN

-N-

100 0 100 200
scale feet

PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	By	Date
1	AS NOTED	EJ	7/7/08

WARNING
0 ? 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

• Project No. 158638.107 • KJ_LY_Base1.dwg • Date May 2007 • Designed EJ • Drawn DAS • Checked EJ • Approved EJ

RAILYARD STORMWATER IMPROVEMENTS -2007
BUTTE, MONTANA

EXISTING SITE CONDITIONS
AND STORMWATER DRAINAGE BOUNDARIES

HKM ENGINEERING
1015 S Montana St
PO Box 3588
Butte, MT 59701-2839
Phone: (406) 723-6213
Fax: (406) 723-6328

Sheet No.
P-1

G:\15\158638107\LowerYard\dwg\KJ_LY_Base1.dwg 7/1/2008 9:25:48 AM MDT

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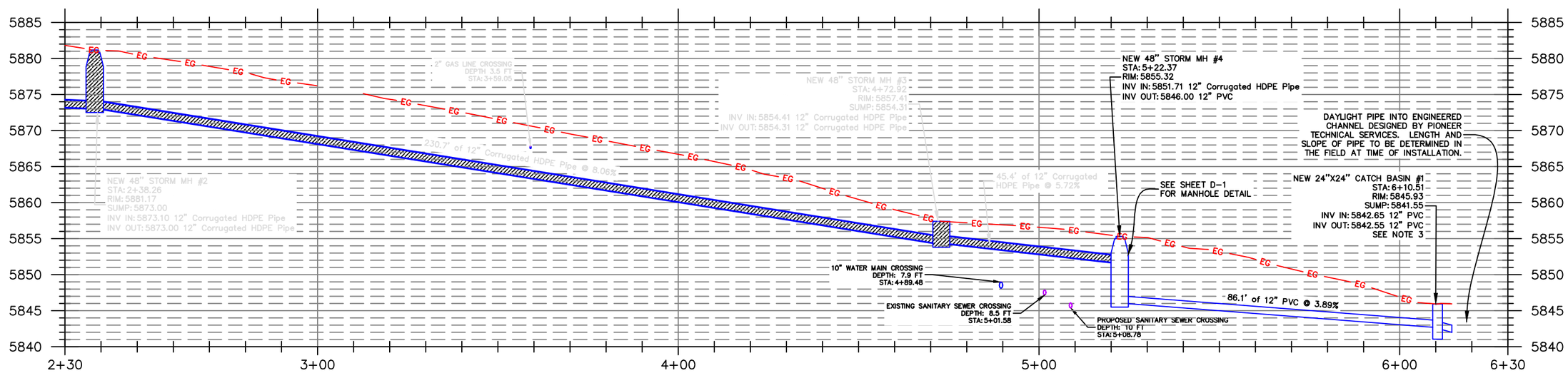
Hornet Street Storm Profile
HORIZONTAL SCALE : 1" = 30'
VERTICAL SCALE: 1" = 15'

INDICATES DIFFERENT PHASE OF PROJECT TO BE COMPLETED BY A DIFFERENT CONTRACTOR



No.	Description	Date

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BUTTE - SILVER BOW
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

HORZ. SCALE 1" = 30'
0 15 30

JOB NO. BSBPWM66
DATE: 9/30/13
DRAFTER: SF
CHECKED BY: FJ

BSB PUBLIC WORKS
HORNET ST STORM WATER PHASE 1

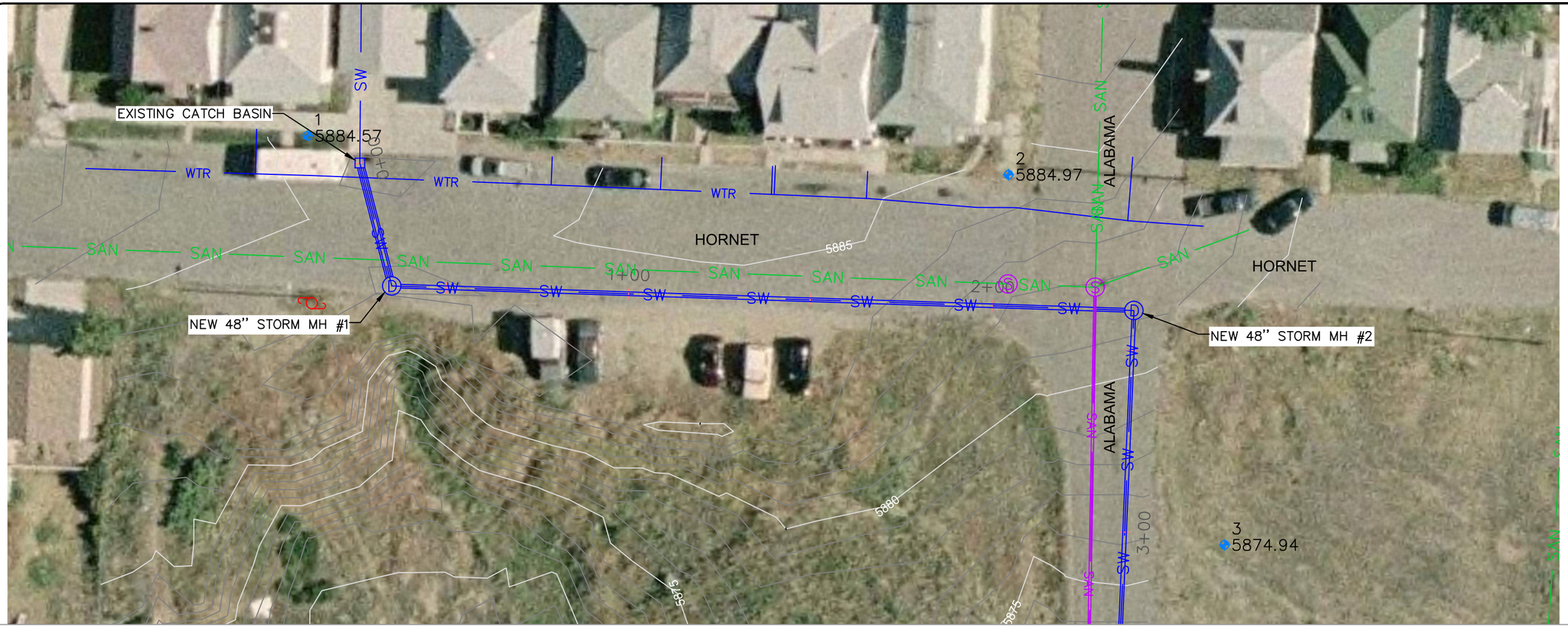
PLAN & PROFILE - PHASE 1

BUTTE, MT 59701

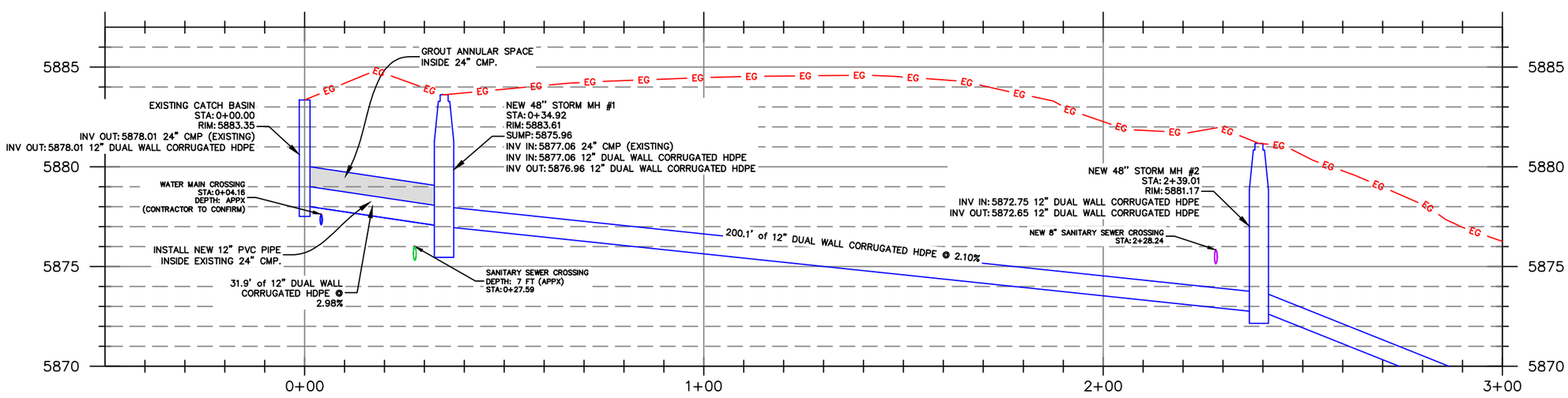
SHEET
3 OF 4

P-1

M:\BSBPWM66\Hornet St Storm and San.dwg



Hornet Street Storm Profile
HORIZONTAL SCALE (PLAN): 1" = 30'
VERTICAL SCALE: 1" = 6'



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BUTTE - SILVER BOW
STATE OF MONTANA
8-2-77

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

N W E S

HORZ. SCALE 1" = 30'
0 15 30

JOB NO. BSBPWM66
DATE: 4/21/14
DRAFTER: SF
CHECKED BY: FJ

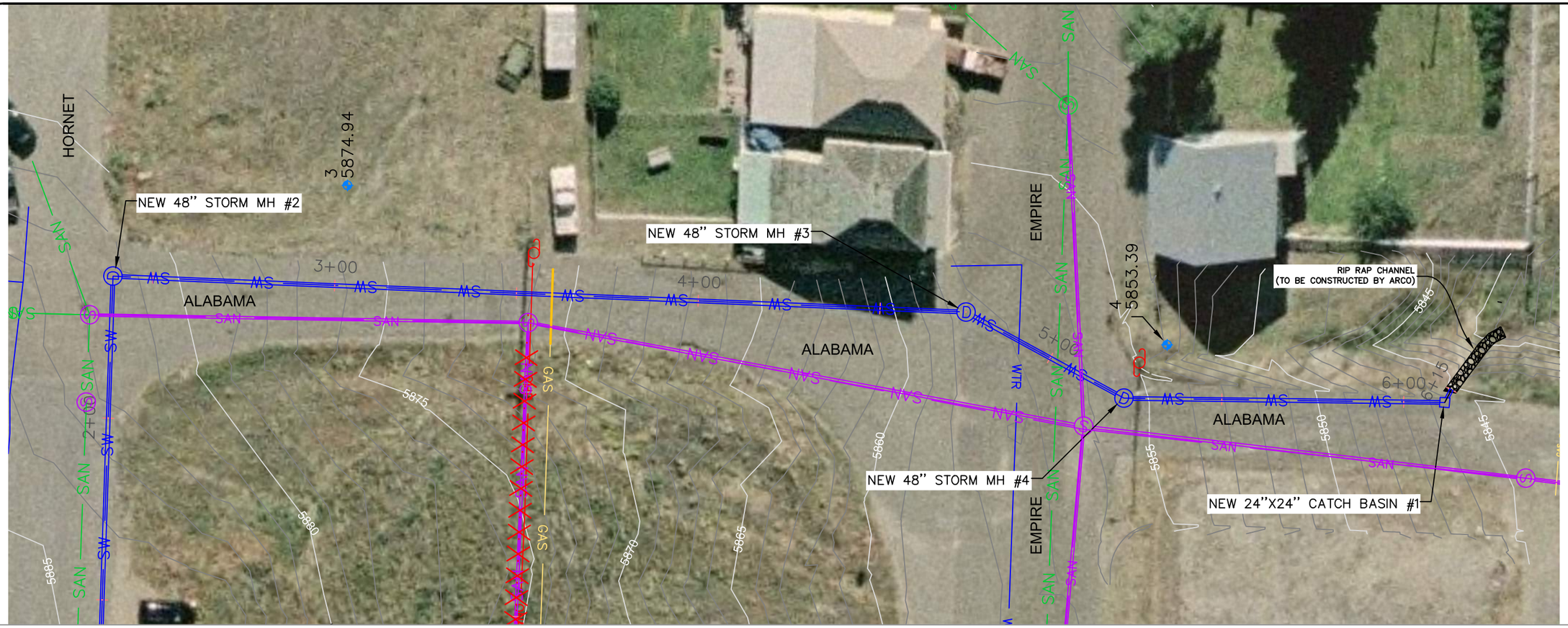
BSB PUBLIC WORKS
HORNET ST STORM WATER PHASE 2

P&P - HORNET

BUTTE, MT 59701

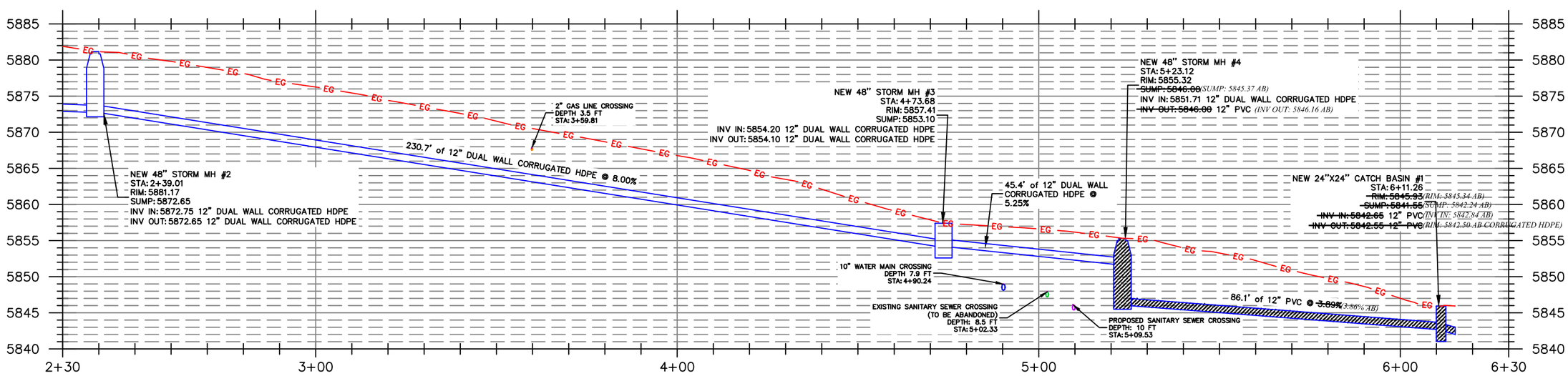
SHEET
3 OF 6

P-1



Hornet Street Storm Profile
HORIZONTAL SCALE : 1" = 30'
VERTICAL SCALE: 1" = 15'

INDICATES PHASE 1 OF PROJECT THAT HAS BEEN COMPLETED



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HORZ. SCALE 1" = 30'
0 15 30

JOB NO. BSBPWM66
DATE: 4/21/14
DRAFTER: SF
CHECKED BY: FJ

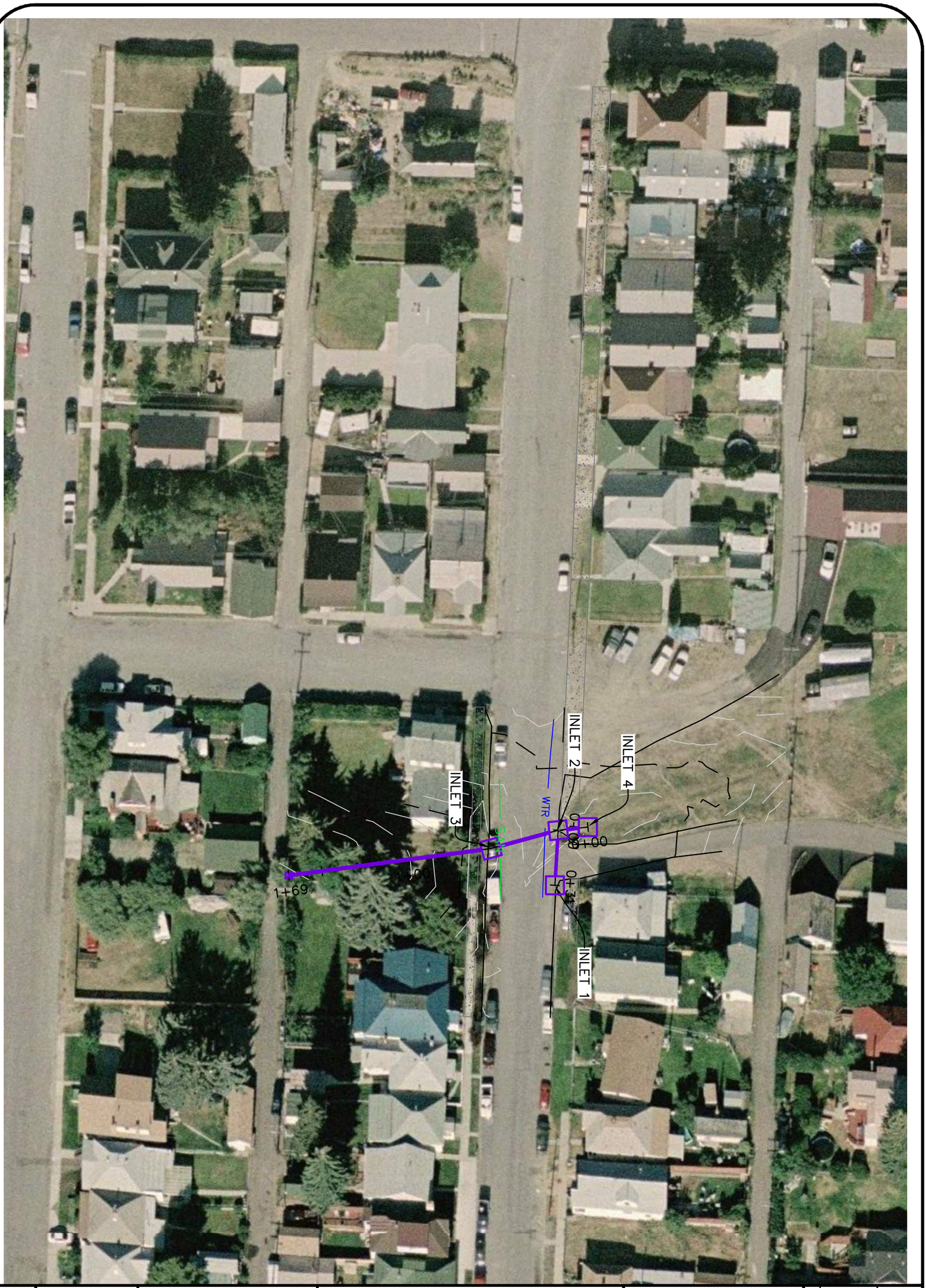
BSB PUBLIC WORKS
HORNET ST STORM WATER PHASE 2

P&P - ALABAMA

BUTTE, MT 59701

SHEET 4 OF 6

P-2



SHEET 3 of 5

JOB # BSBPWM51
DATE: 11/15/2012
DESIGNER: AM
CHK'D BY: K.D.

SCALE 1" = 50'
0 25 50

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C-1AB

Butte Silver-Bow Public Works
STORM SEWER AS-BUILT

PROJECT LOCATION

Hornet Street, Butte, Montana

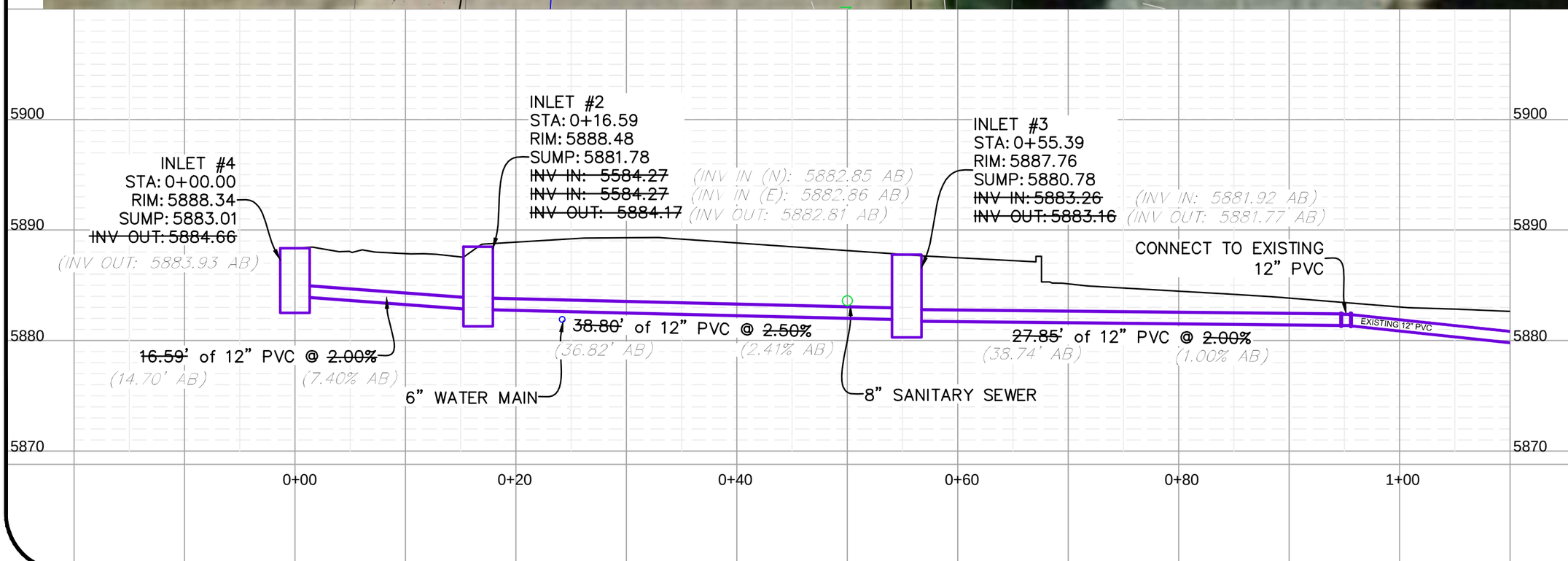
WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Suite 200
480 E. Park Street
Butte, MT 59701
(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

STATE OF MONTANA · BUTTE-SILVER BOW · THE RICHEST HILL ON EARTH · S-2-77

No.	Revision/Issue	Date
1	As-Built	11-2-12



No.	Revision/Issue	Date
1	As-Built	11-2-12

BUTTE-SILVER BOW
THE RICHEST HILL ON EARTH
5-2-77
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Suite 200
480 E. Park Street
Butte, MT 59701
(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

SCALE 1" = 10'

JOB # BSBPWM51
DATE: 11/15/2012
DESIGNER: AM
CHK'D BY: KD

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Butte Silver-Bow Public Works
STORM SEWER AS-BUILT

PLAN & PROFILE

Hornet Street, Butte, Montana

SHEET
4 of 5

P-1AB

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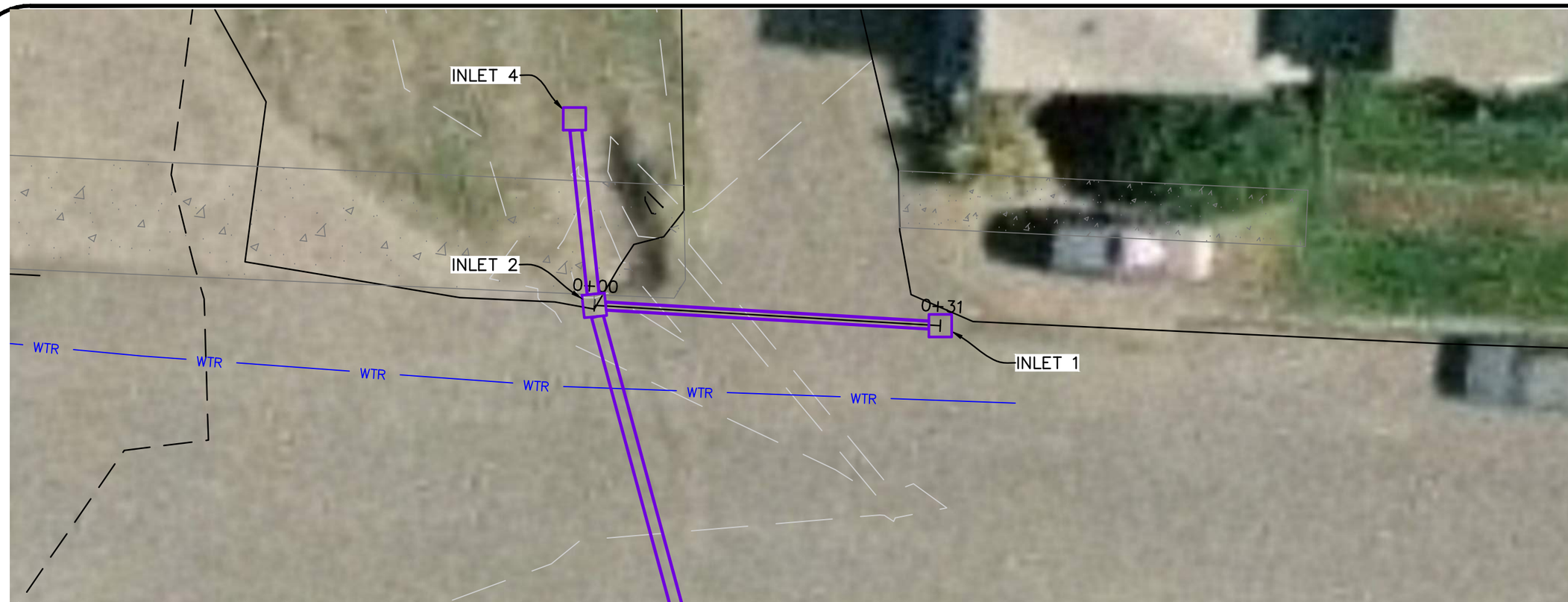

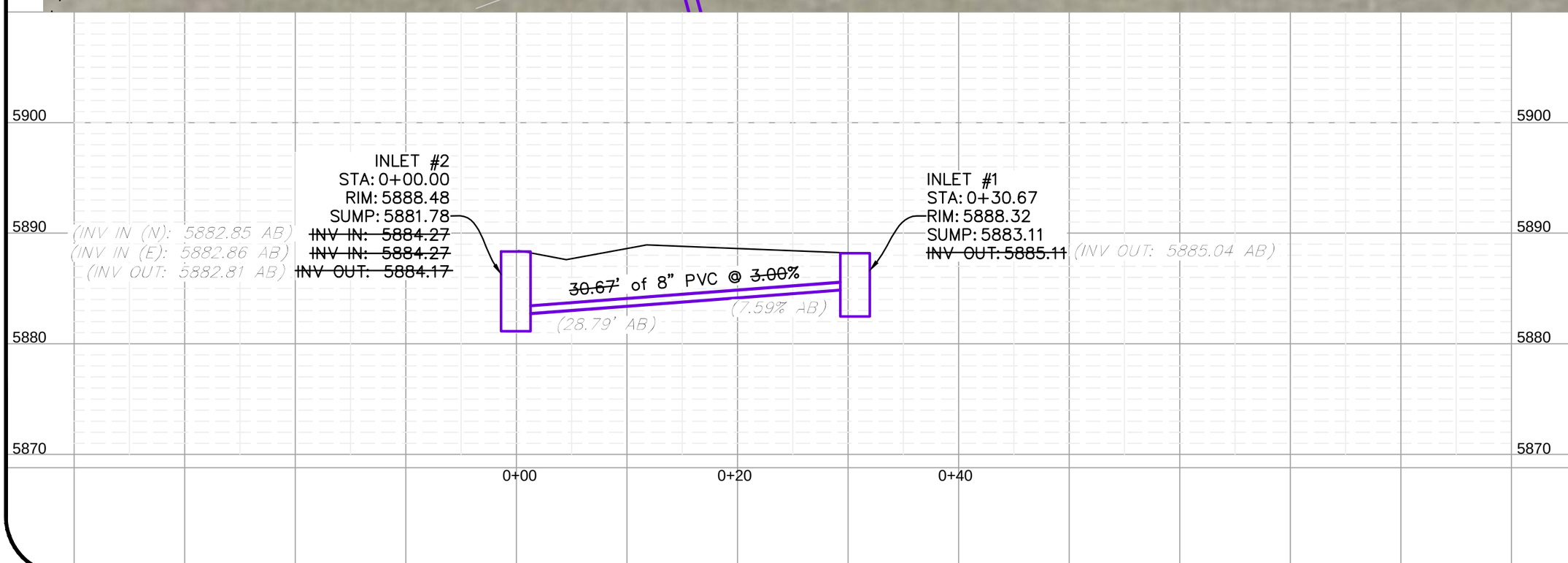

No.	Revision/Issue	Date
1	As-Built	11-2-12

BUTTE-SILVER BOW
5-2-77
THE RICHEST HILL ON EARTH
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC
Suite 200
480 E. Park Street
Butte, MT 59701
(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

SCALE 1" = 10'

JOB # BSBPWM51
DATE: 11/12/2012
DESIGNER: AM
CHK'D BY: KD

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Butte Silver-Bow Public Works
STORM SEWER AS-BUILT
PLAN & PROFILE
Hornet Street, Butte, Montana

SHEET
3 of 3

P-2AB

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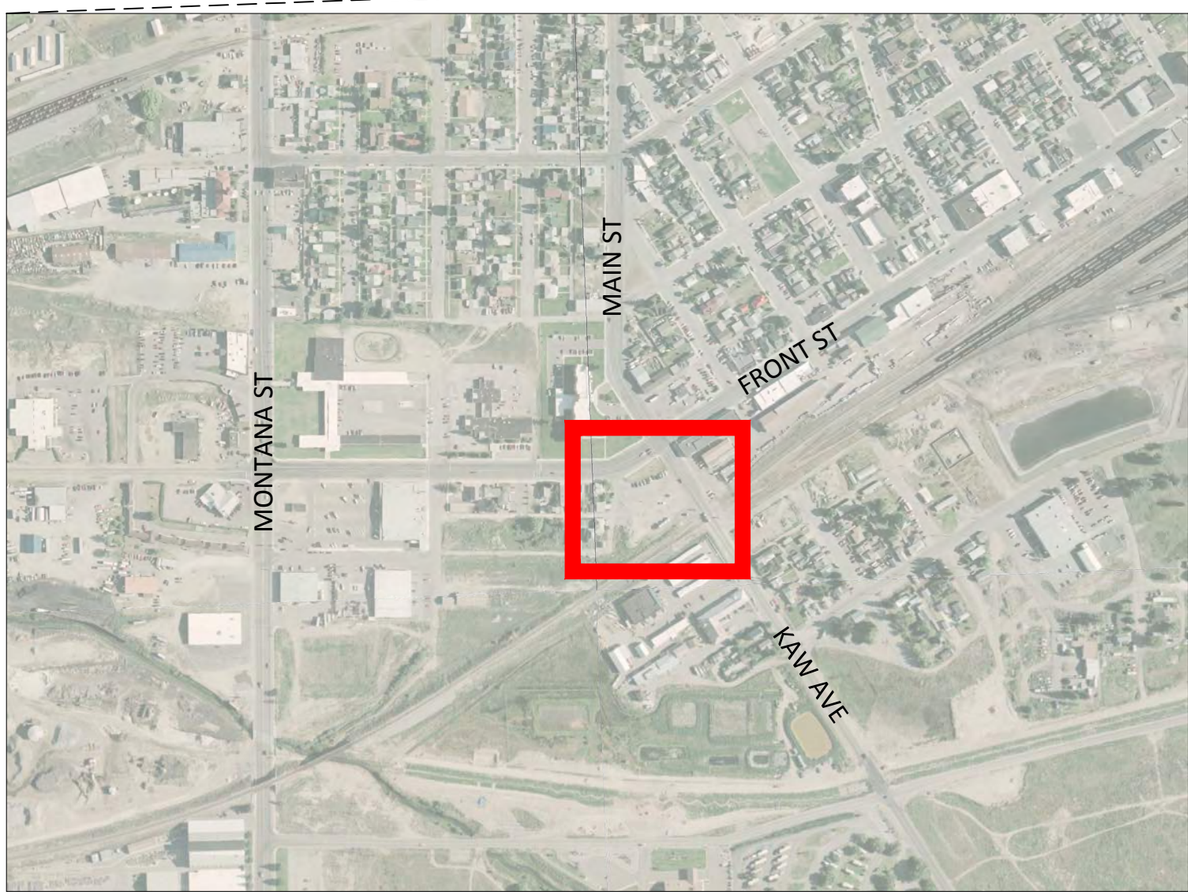
KAW AVENUE STORM WATER RE-ROUTE PROJECT

LOCATED IN SILVER BOW COUNTY, MT

MONTANA
JOSHUA F. VINCENT
8-1-2014
No. 12994 PE
LICENSED PROFESSIONAL ENGINEER



Montana 811
Know what's below.
Call 811 before you dig.

SHEET INDEX	
SHT. No.	DRAWING TITLE
T-1	PROJECT LOCATION
T-2	CONSTRUCTION NOTES
S-1	SITE PLAN
P-1	PLAN & PROFILE - STA 1+00 TO 2+50
P-2	PLAN & PROFILE - STA 2+00 TO 4+75
P-3	PLAN & PROFILE - STA 4+75 TO 7+50
P-4	PLAN & PROFILE - SWALE
XS-1	CROSS SECTIONS - STA 1+00 TO 4+50
XS-2	CROSS SECTIONS - STA 5+00 TO 7+00
D-1	DETAILS - MH #1 & MH #2
D-2	DETAILS MH #3 & MH #4
D-3	DETAILS - TYPICAL TRENCH & OUTLET
D-4	DETAILS - SIDEWALK, LAYDOWN, DI #1

No.	Description	Date
0	DRAFT	7/18/14
1	FINAL	8/1/14

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480 E. Park Street
Butte, MT 59701
(406)-782-5220

N W E S

JOB NO: BSBPWM87
DATE: 8/1/14
DRAFTER: SF & AF
CHECKED BY: SN & JV

BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
PROJECT LOCATION
BUTTE, MT

SHEET 1 OF 13

T-1

CONSTRUCTION NOTES:

1. EXISTING UTILITY LOCATIONS AND DEPTHS ARE APPROXIMATE. EXACT LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.
2. ELEVATIONS BASED ON NAVD 88 DATUM GEOID 09.
3. ALL UNITS ARE IN DECIMAL FEET UNLESS INDICATED.
4. UNLESS OTHERWISE INDICATED IN THE DRAWINGS OR SPECIFICATIONS, ALL WORK WILL CONFORM TO MPWSS, 6TH EDITION, APRIL 2010.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS REQUIRED FOR CONSTRUCTION ACTIVITIES.
6. THE CONTRACTOR SHALL MAINTAIN SERVICE OF ALL EXISTING UTILITIES. IF SAID SERVICE IS DAMAGED, THE CONTRACTOR SHALL IMMEDIATELY REPAIR THE DAMAGE AT THE CONTRACTOR'S EXPENSE.
7. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST AND EROSION DURING CONSTRUCTION. AREAS SHALL BE WATERED TO CONTROL DUST WHEN ORDERED BY THE ENGINEER. EROSION SHALL BE CONTROLLED IN ACCORDANCE WITH MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY REGULATIONS AND BUTTE-SILVER BOW MUNICIPAL STORM WATER ENGINEERING STANDARDS.
8. THE CONTRACTOR SHALL REFERENCE ALL SURVEY CONTROL, SECTION CORNERS, AND PROPERTY CORNERS PRIOR TO BEING DISTURBED BY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT OF ANY STAKING POINTS, CONTROL, MONUMENTS, AND CORNERS THAT ARE DISTURBED DURING CONSTRUCTION.
9. EXCAVATION, BACKFILL, AND COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH MPWSS SECTION 02221 AND 02230 AND THESE DRAWINGS AND SPECIFICATIONS. PIPE AND MANHOLE INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH MPWSS SECTION 02720 AND THESE DRAWINGS AND SPECIFICATIONS.
10. THE CONTRACTOR SHALL PROVIDE STORM WATER BYPASS DURING CONSTRUCTION.
11. RAILROAD TIES WERE NOT SURVEYED AND ARE FOR ILLUSTRATION PURPOSES ONLY.
12. PROPOSED 36-INCH PIPE MATERIAL SHALL BE ADS HP STORM DUAL-WALL CORRUGATED POLYPROPYLENE (PP).
13. EXISTING 21"x15" ELLIPTICAL STORM PIPE DOWNSTREAM OF MANHOLE #1 SHALL BE ABANDONED AND PLUGGED WITH CONCRETE OR GROUT.
14. EXCAVATED SOIL FROM RAILROAD RIGHT-OF-WAY SHALL BE HANDLED ACCORDING TO THE RAILROAD SOIL MANAGEMENT PLAN. ALL OTHER EXCAVATED SOIL SHALL BE HANDLED ACCORDING TO THE BUTTE-SILVER BOW EXCAVATION AND DIRT MOVING PROTOCOLS (MAY 2013). IF HYDROCARBON CONTAMINATED SOIL IS ENCOUNTERED, CONTRACTOR SHALL NOTIFY ENGINEER TO DETERMINE APPROPRIATE DISPOSAL ACTION.
15. QUANTITIES SHOWN IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES.
16. SEVERAL ABOVE GROUND UTILITY POLES ARE LOCATED IN CLOSE PROXIMITY TO EXCAVATION LOCATIONS. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE INTEGRITY AND STABILITY OF UTILITY POLES DURING THE WORK, WHICH MAY INCLUDE, BUT IS NOT LIMITED TO, PROVIDING TEMPORARY SUPPORT TO POLES THROUGHOUT THE PROJECT.

2 / D-1 — INDICATES DETAIL LOCATION. "2" REFERS TO THE DETAIL DESIGNATION. "D-1" REFERS TO THE DRAWING NUMBER WHERE THE INDICATED DETAIL IS SHOWN.

EXISTING FEATURES LEGEND

STM	STORM SEWER PIPE		RAILROAD TRACKS
SAN	SANITARY SEWER PIPE		PROPERTY BOUNDARY (APPROX.)
OHE	OVERHEAD ELECTRIC	EG	EXISTING GROUND PROFILE
UGE	UNDERGROUND ELECTRIC	D	STORM SEWER MANHOLE
UG–FO	UNDERGROUND FIBER OPTIC		DROP INLET
GAS	NATURAL GAS	S	SANITARY SEWER MANHOLE
UG–BNSF	UNDERGROUND BNSF SIGNAL LINES		GUY
	FENCE		UTILITY POLE
	EXISTING GROUND CONTOUR (1 FT)		GAS PIPE VENT
	EXISTING GROUND CONTOUR (5 FT)	W	GROUNDWATER WELL

DESIGN FEATURES LEGEND

	FINISHED GRADE CONTOUR (1 FT - RED)
	FINISHED GRADE CONTOUR (5 FT - GREEN)
FG	FINISHED GRADE PROFILE
	TRENCH EXCAVATION (XS-1 & XS-2)
	FINISHED GRADE FILL PROFILE (XS-1 & XS-2)
	CONCRETE FLARED END
D	STORM SEWER MANHOLE
	DROP INLET
	CONTROL POINT

QUANTITIES:

ITEM	QUANTITY	UNITS
EXCAVATION (BANK)	1170	CUBIC YARDS
STRUCTURAL FILL (COMPACTED)	400	CUBIC YARDS
BORROW MATERIAL (COMPACTED)	1200	CUBIC YARDS
60" STORM SEWER MANHOLE	3	EACH
96" STORM SEWER MANHOLE	1	EACH
30" DROP INLET	1	EACH
36" CONCRETE FLARED END	1	EACH
36" DIAMETER CORRUGATED PP PIPE	400	LINEAL FEET
24" DIAMETER CORRUGATED HDPE PIPE	10	LINEAL FEET
12" DIAMETER CORRUGATED HDPE PIPE	10	LINEAL FEET
CLASS I RIPRAP	13	CUBIC YARDS
8-oz NONWOVEN GEOTEXTILE FABRIC	300	SQUARE FEET
SIDEWALK/CURB/APPROACH REPLACEMENT	425	SQUARE FEET
TURF REINFORCEMENT MAT	4050	SQUARE FEET

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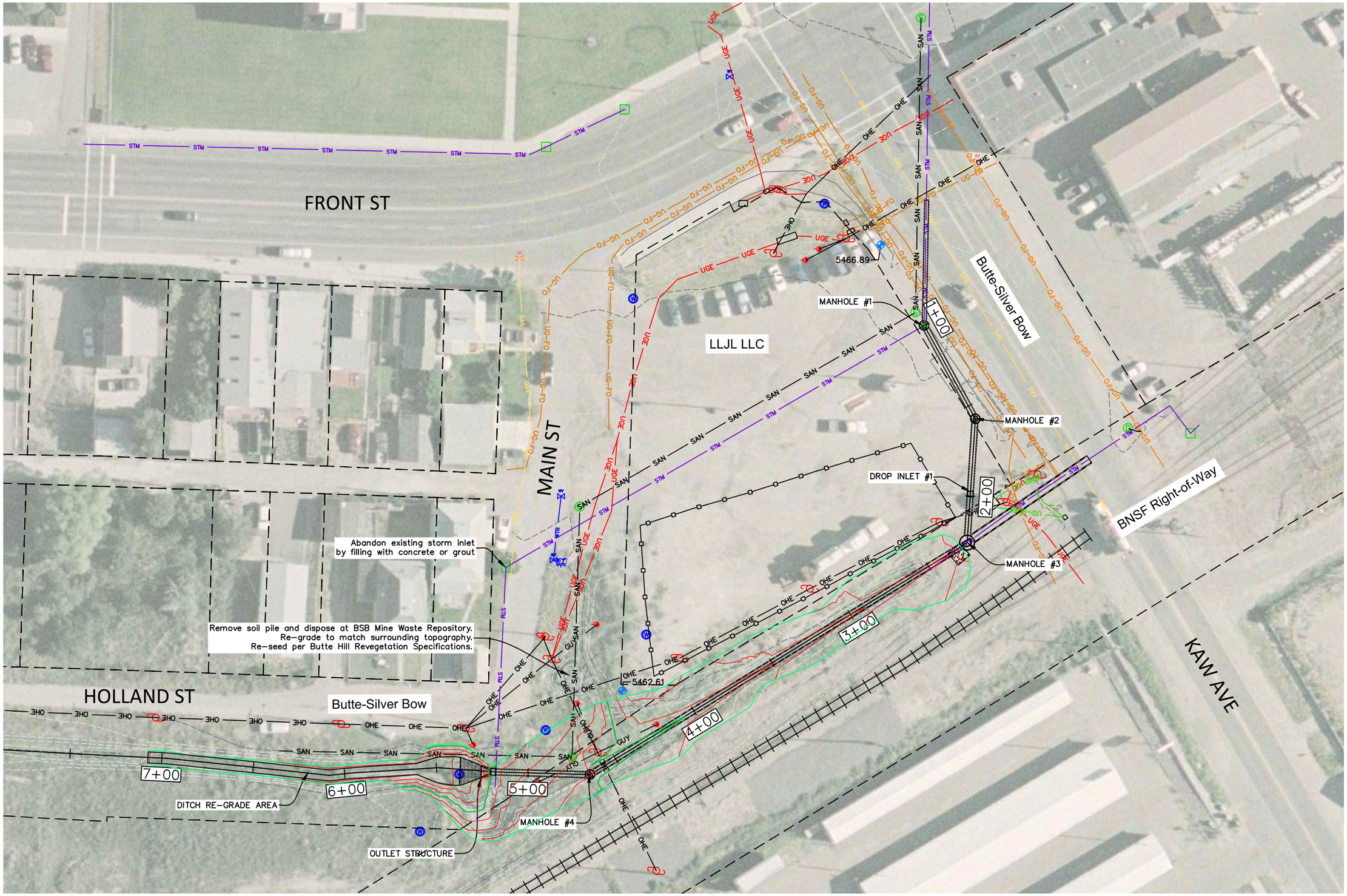
BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
CONSTRUCTION NOTES
BUTTE, MT



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SCALE : 1" = 50'

JOB NO: BSBPWM87
DATE: 8/1/14
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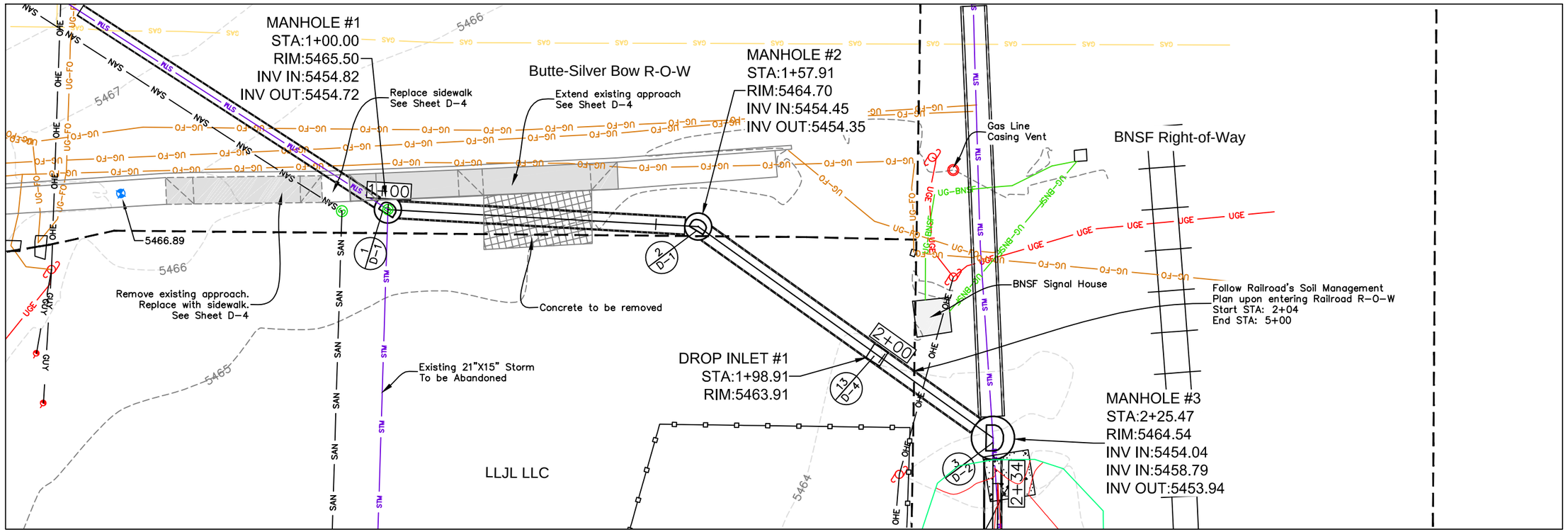
BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT

SITE PLAN

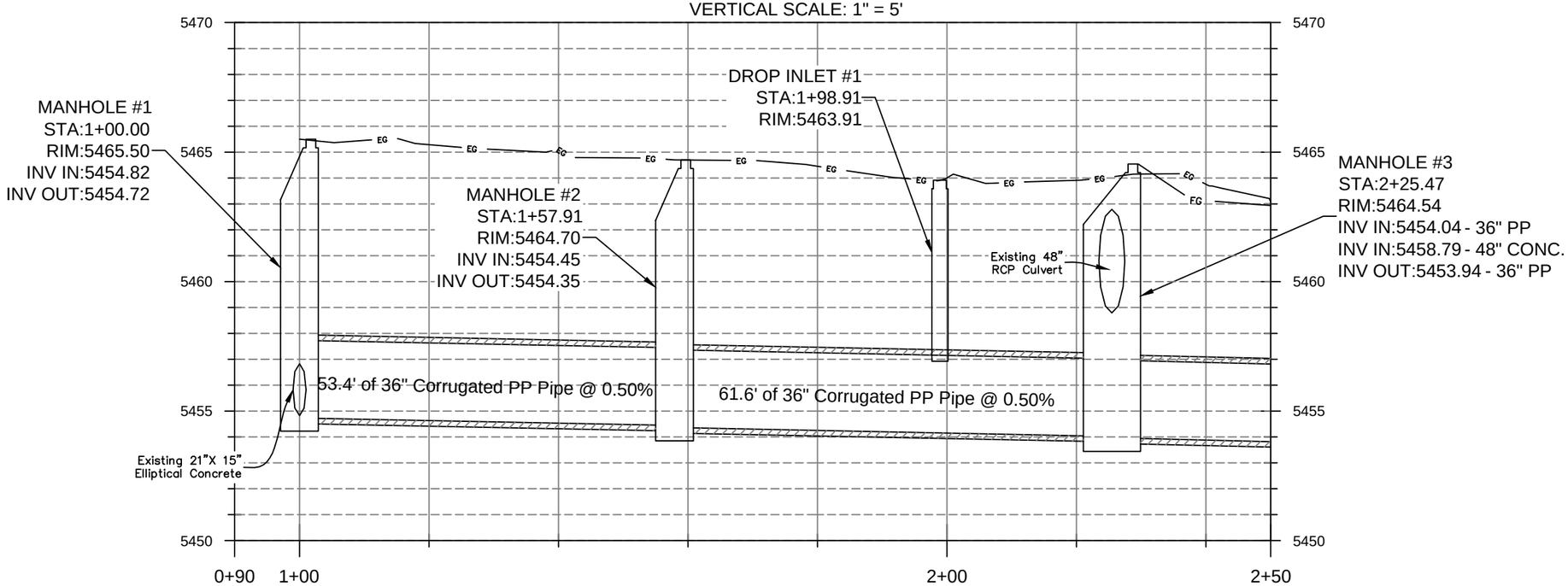
BUTTE, MT

SHEET 3 OF 13

S-1



KAW AVE. STORM PROFILE
VERTICAL SCALE: 1" = 5'



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SCALE: 1" = 20'

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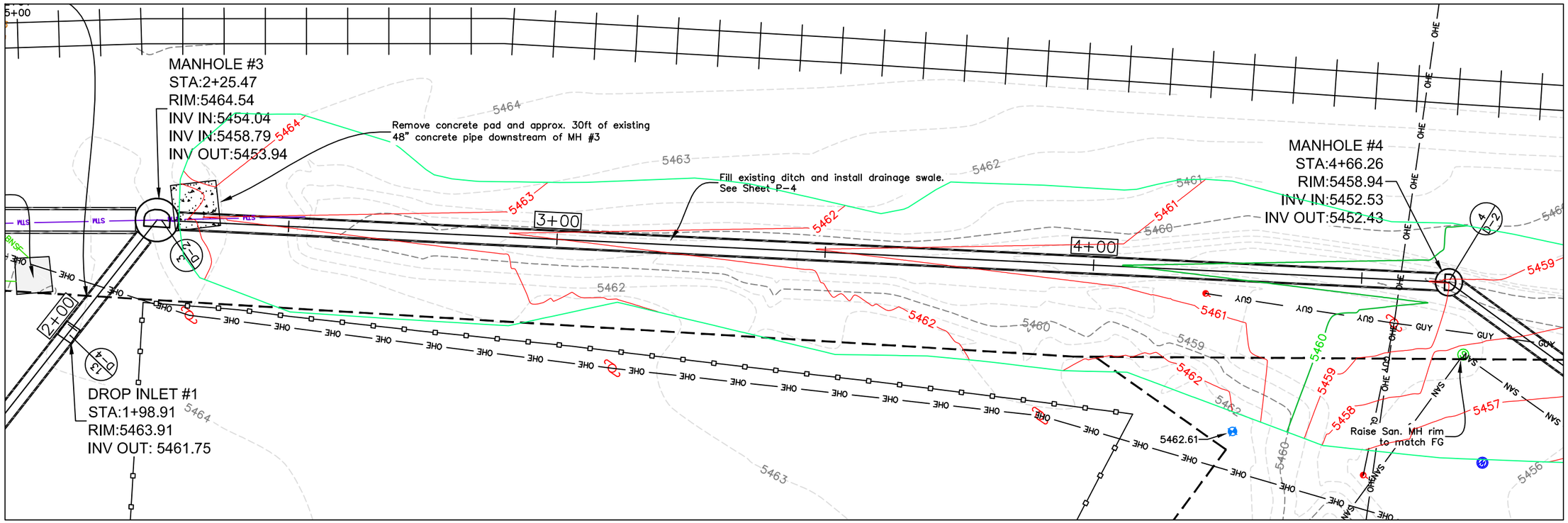
KAW AVENUE STORM WATER RE-ROUTE PROJECT

PLAN & PROFILE - STA1+00 TO 2+50

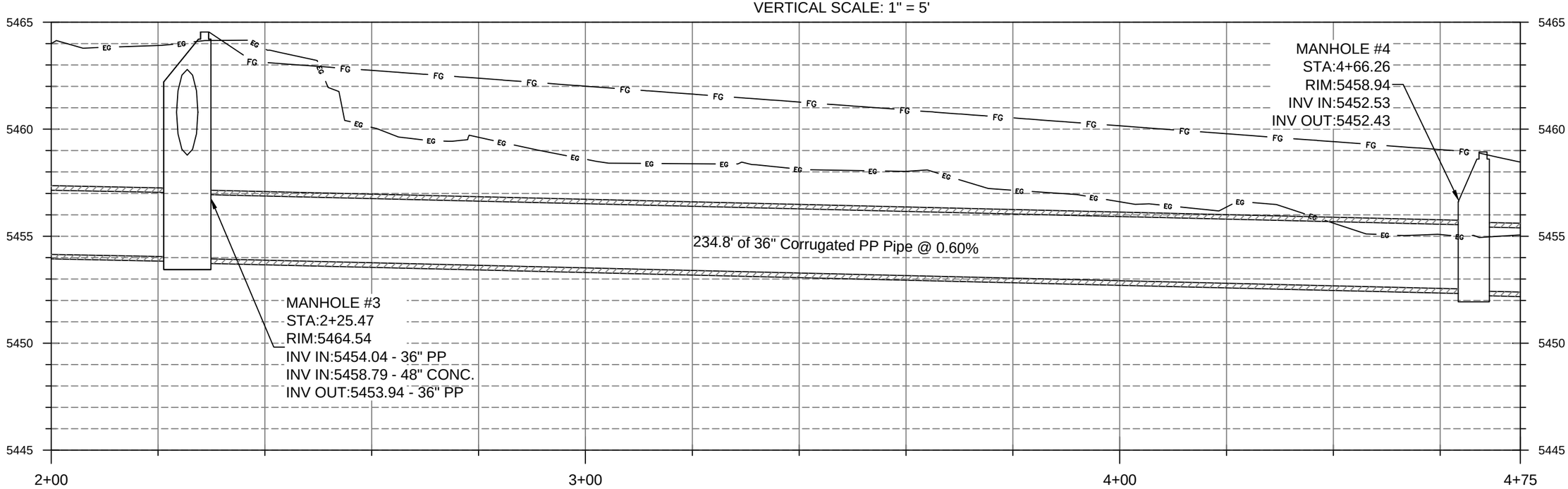
BUTTE, MT

SHEET 4 OF 13

P-1



KAW AVE. STORM PROFILE
VERTICAL SCALE: 1" = 5'



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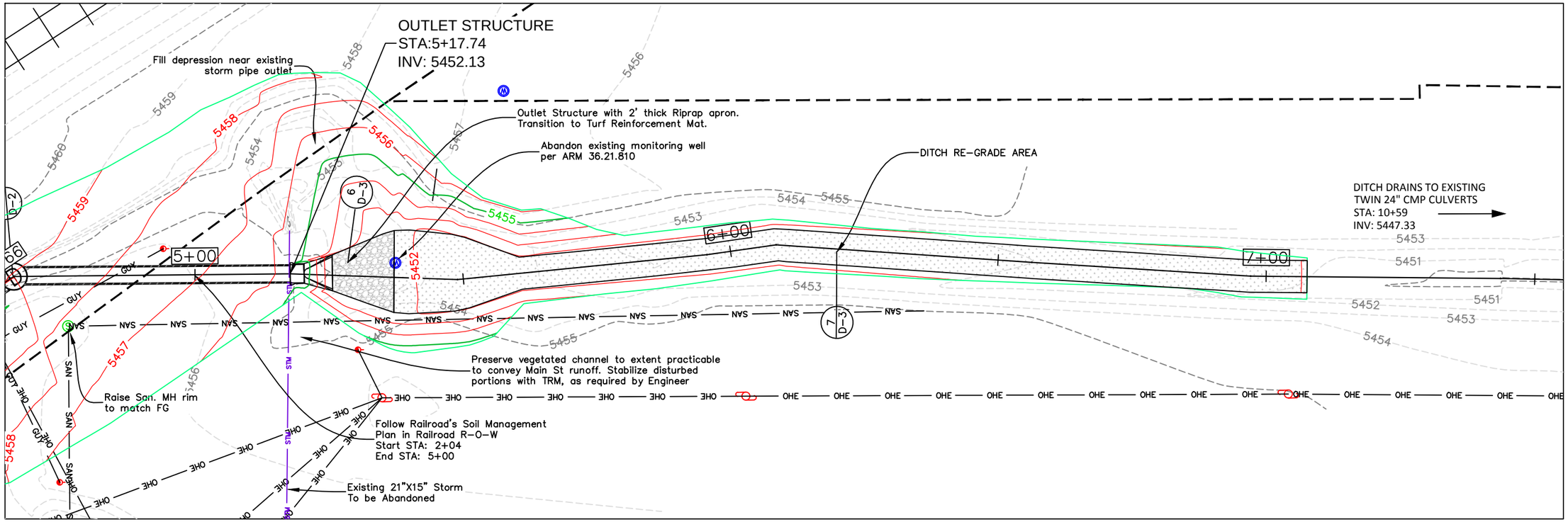
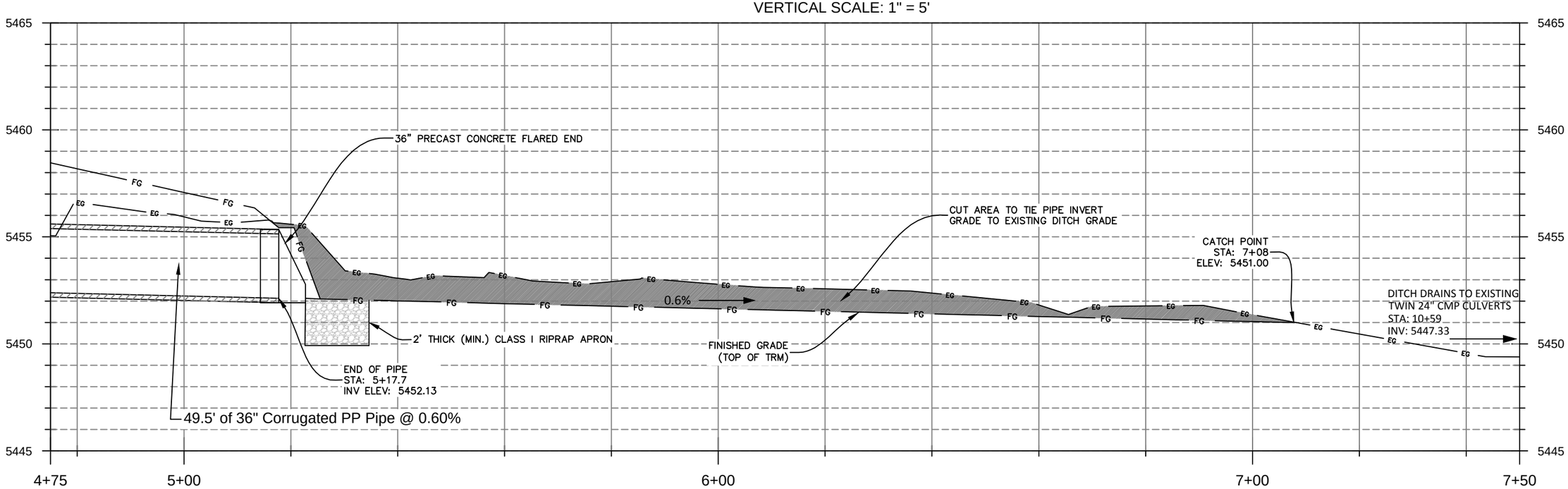
KAW AVENUE STORM WATER RE-ROUTE PROJECT
PLAN & PROFILE - STA 2+00 TO 4+75
BUTTE, MT

SHEET 5 OF 13

P-2



KAW AVE STORM PROFILE
VERTICAL SCALE: 1" = 5'



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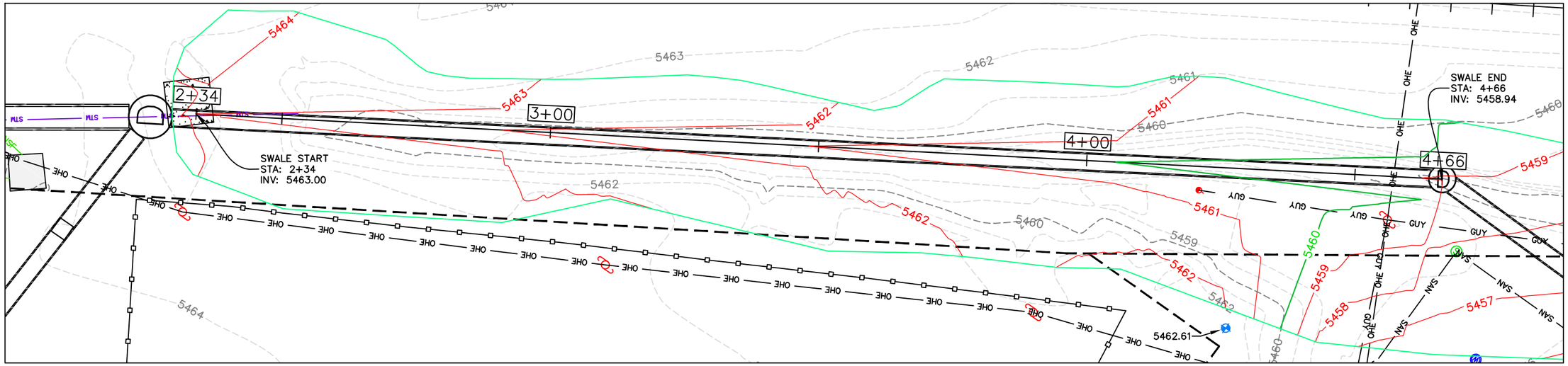
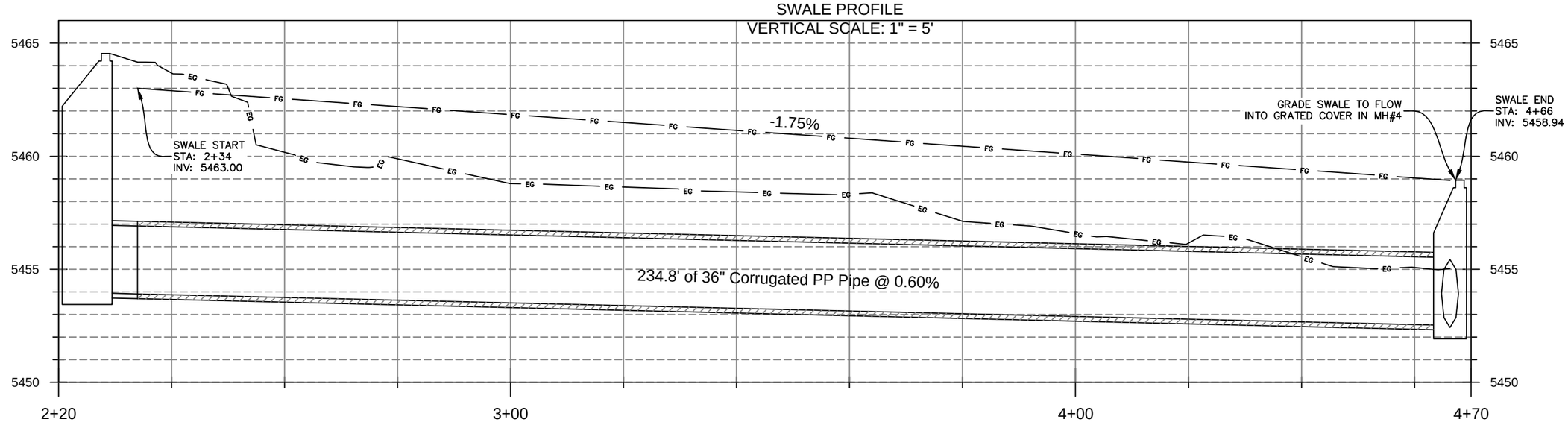
KAW AVENUE STORM WATER RE-ROUTE PROJECT
PLAN & PROFILE - STA 4+75 TO 7+50
BUTTE, MT

SHEET 6 OF 13

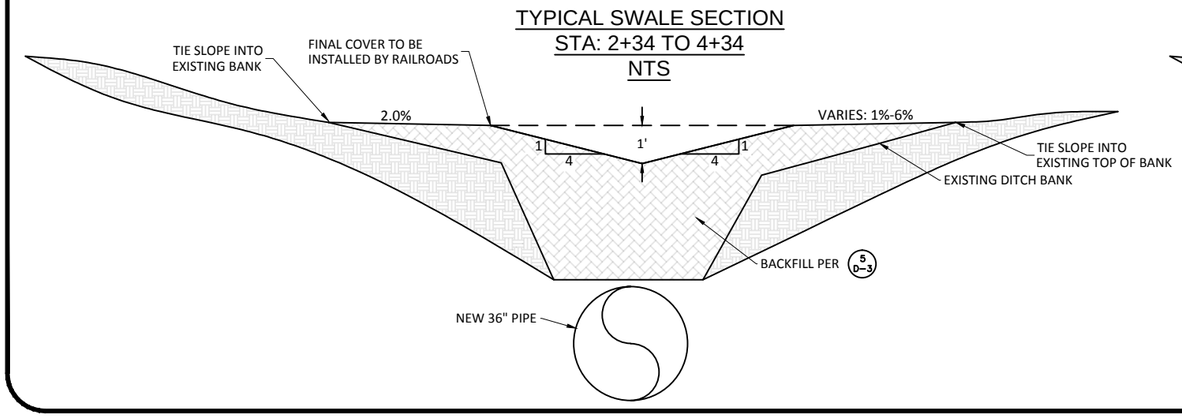
P-3



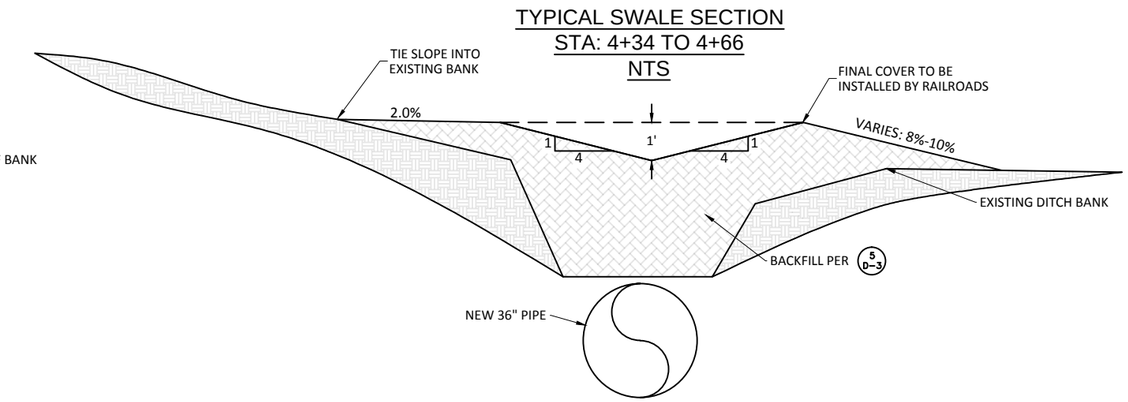
SWALE PROFILE
VERTICAL SCALE: 1" = 5'



TYPICAL SWALE SECTION
STA: 2+34 TO 4+34
NTS



TYPICAL SWALE SECTION
STA: 4+34 TO 4+66
NTS



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SCALE: 1" = 20'

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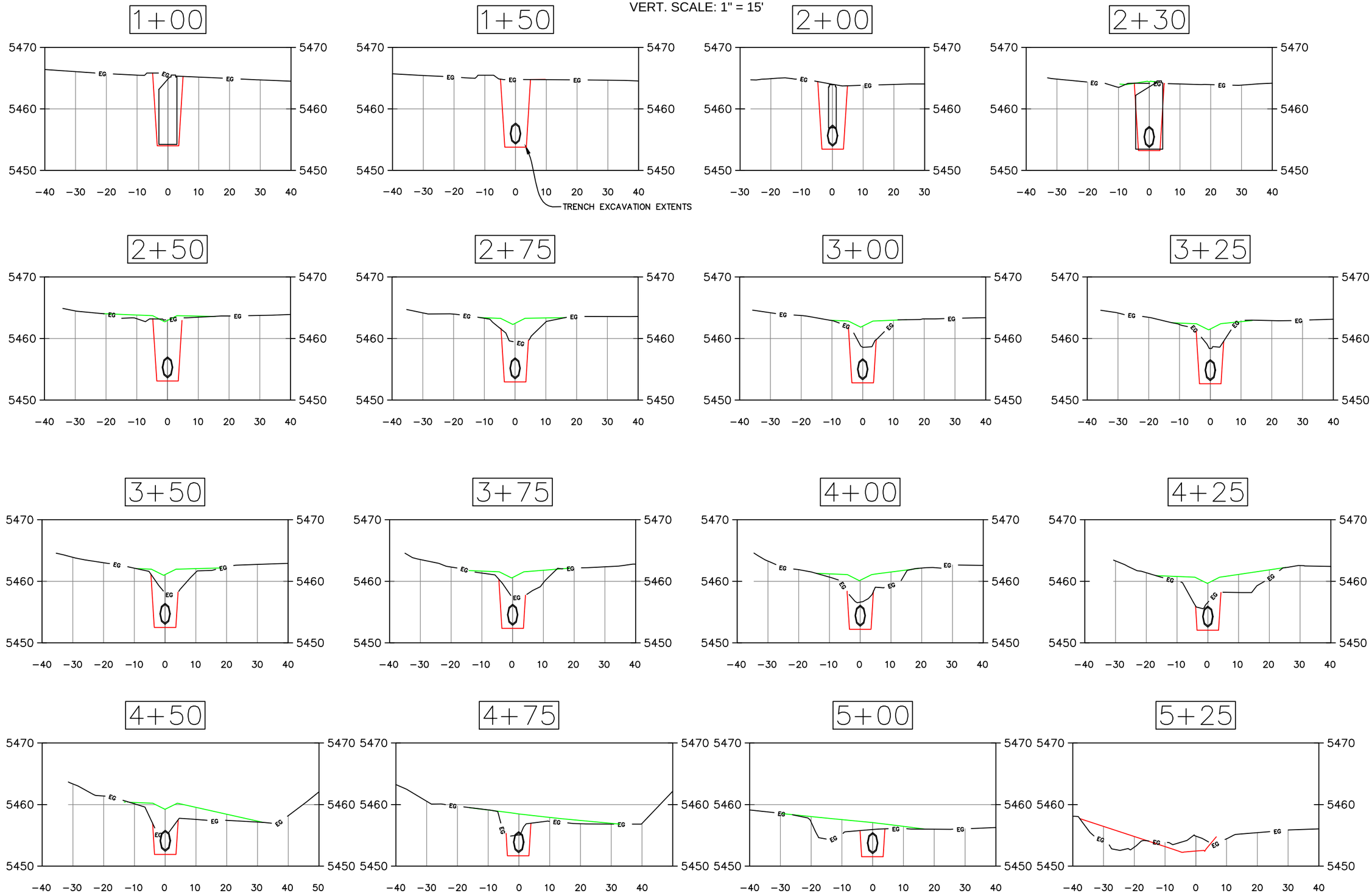
PLAN & PROFILE - SWALE
BUTTE, MT

SHEET
7 OF 13

P-4

HORZ. SCALE: 1" = 30'
VERT. SCALE: 1" = 15'



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SCALE: 1" = 30'

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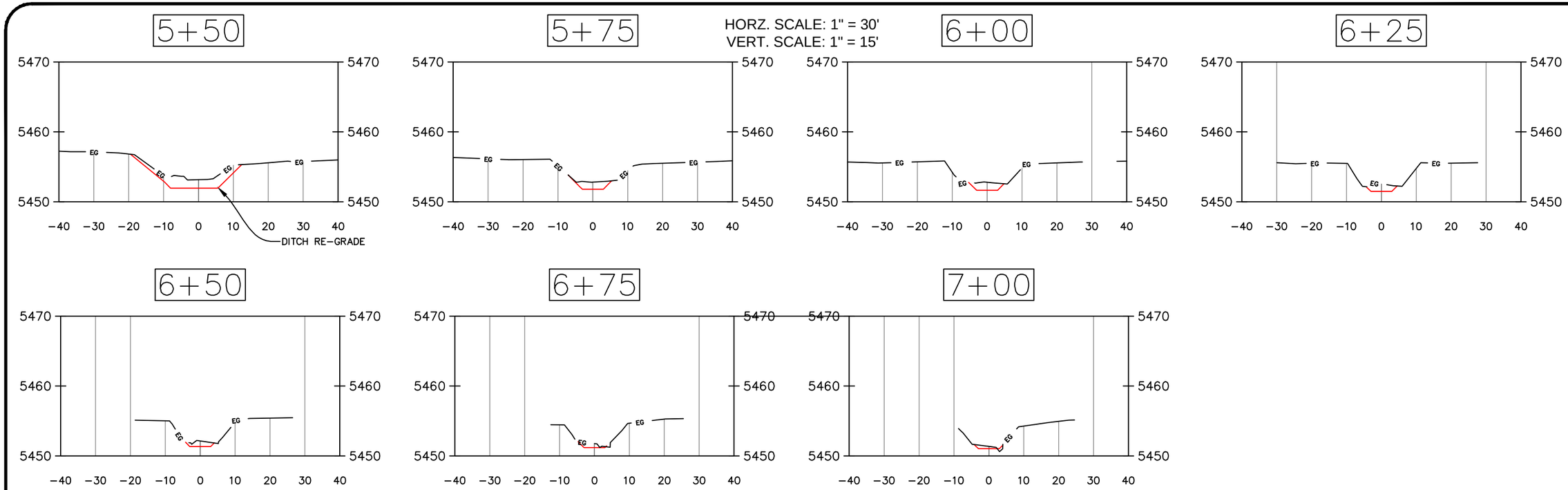
CROSS SECTIONS - STA 1+00 TO 5+25

BUTTE, MT

SHEET 8 OF 13

XS-1

HORZ. SCALE: 1" = 30'
VERT. SCALE: 1" = 15'



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SCALE: 1" = 30'
0 15 30 Feet

JOB NO: BSBPWM87
DATE: 8/1/14
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BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
CROSS SECTIONS - STA 5+50 TO 7+00
BUTTE, MT

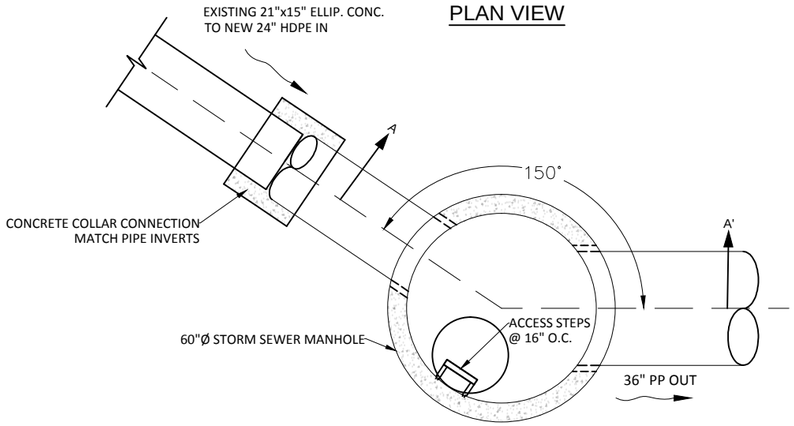
SHEET 9 OF 13

XS-2

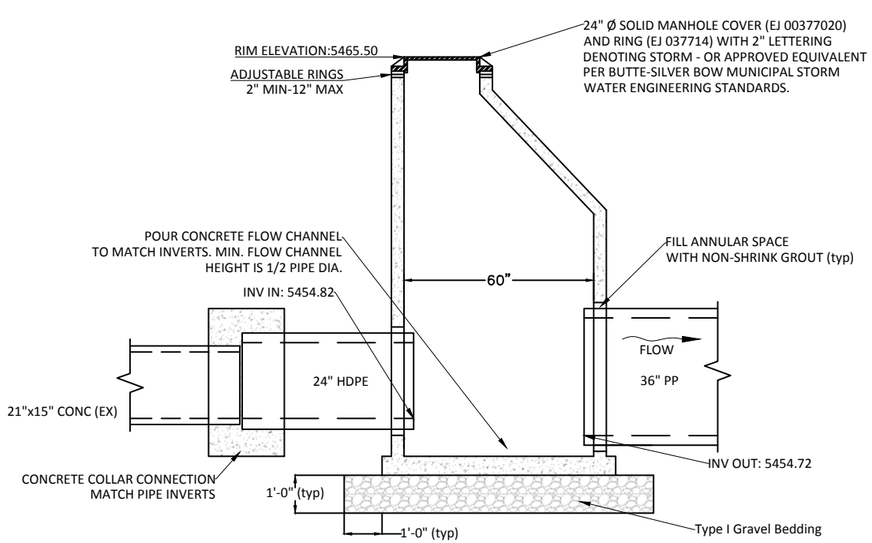
1 MANHOLE #1 (STA 1+00)

Scale: NTS

PLAN VIEW



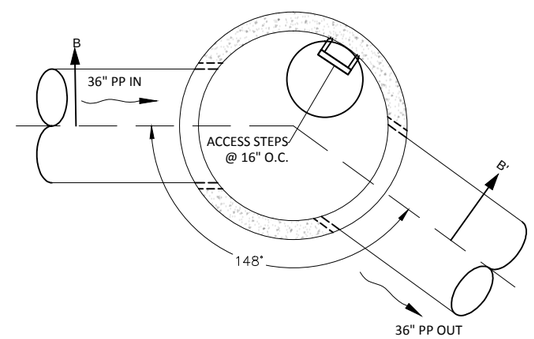
SECTION VIEW A-A'



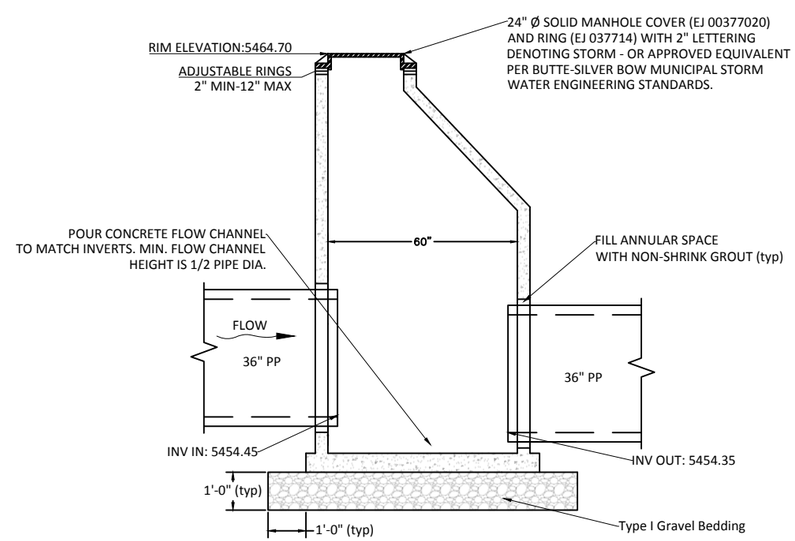
2 MANHOLE #2 (STA 1+57.91)

Scale: NTS

PLAN VIEW



SECTION VIEW B-B'



NOTES:

1. ALL PRECAST AND CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. CEMENTITIOUS MATERIALS FOR CONCRETE SHALL MEET ASTM C150 TYPE V SPECIFICATIONS, OR EQUIVALENT, FOR HIGH SULFATE RESISTANCE.
2. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
3. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60 KSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE
4. RAM-NEK, OR EQUIVALENT, SHALL BE PLACED BETWEEN EACH LEVEL OF ADJUSTING RINGS, TOP OF SLAB, AND BOTTOM OF IRON RING.
5. BASE, COVER SLAB, AND WALL THICKNESS TO BE DETERMINED BY PRECAST MANUFACTURER.
6. VERTICAL TOLERANCE FOR MANHOLE INSTALLATION SHALL BE ± 1 INCH.
7. MANHOLES, RINGS, AND COVERS TO BE AASHTO H20 LOAD RATED.

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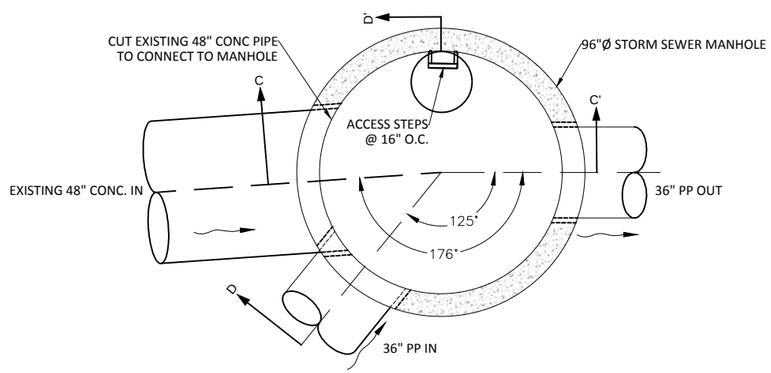
BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
MH #1 & MH #2
BUTTE, MT

D-1

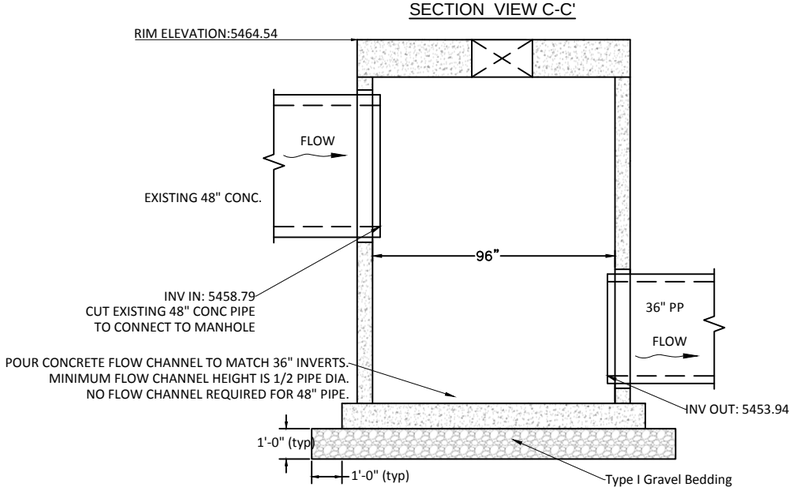
3 MANHOLE #3 (STA 2+25.47)

Scale: NTS

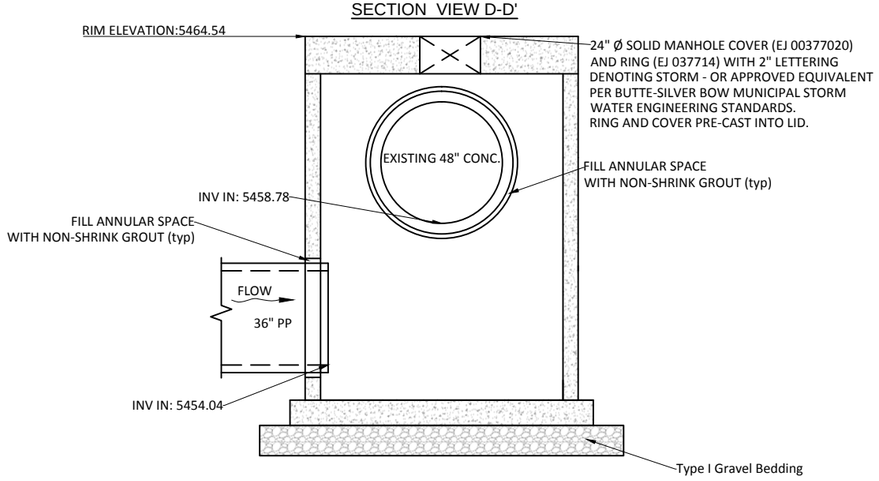
PLAN VIEW



SECTION VIEW C-C'



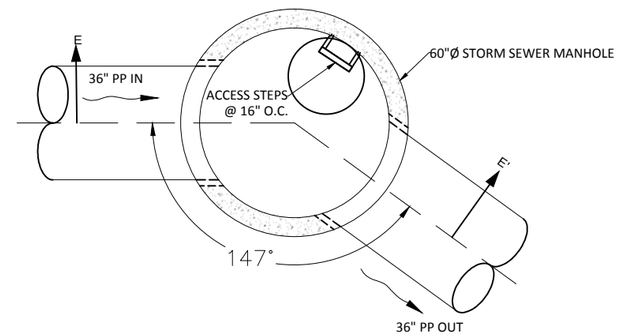
SECTION VIEW D-D'



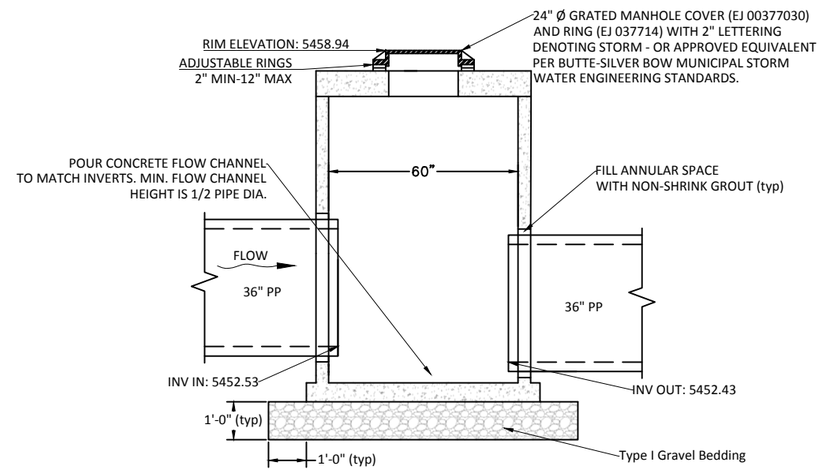
4 MANHOLE #4 (STA 4+66.26)

Scale: NTS

PLAN VIEW



SECTION VIEW E-E'



NOTES:

1. ALL PRECAST AND CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. CEMENTITIOUS MATERIALS FOR CONCRETE SHALL MEET ASTM C150 TYPE V SPECIFICATIONS, OR EQUIVALENT, FOR HIGH SULFATE RESISTANCE.
2. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
3. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60 KSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE
4. RAM-NEK, OR EQUIVALENT, SHALL BE PLACED BETWEEN EACH LEVEL OF ADJUSTING RINGS, TOP OF SLAB, AND BOTTOM OF IRON RING.
5. BASE, COVER SLAB, AND WALL THICKNESS TO BE DETERMINED BY PRECAST MANUFACTURER.
6. VERTICAL TOLERANCE FOR MANHOLE INSTALLATION SHALL BE ± 1 INCH.
7. MANHOLES, RINGS, AND COVERS TO BE AASHTO H20 LOAD RATED.

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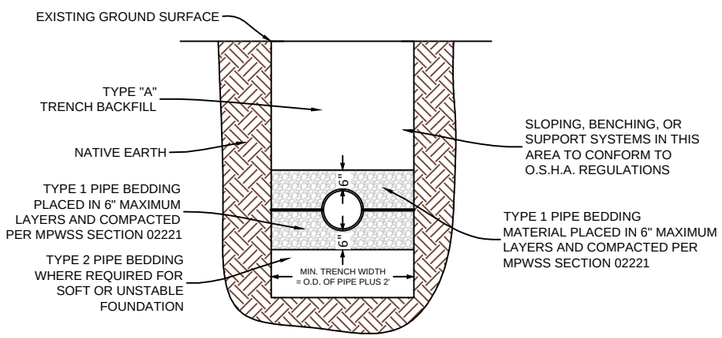
BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
MH #3 & MH #4
BUTTE, MT

SHEET
11 OF 13

D-2

5 TYPICAL TRENCH

Scale: NTS



TRENCH BACKFILL GRADATION

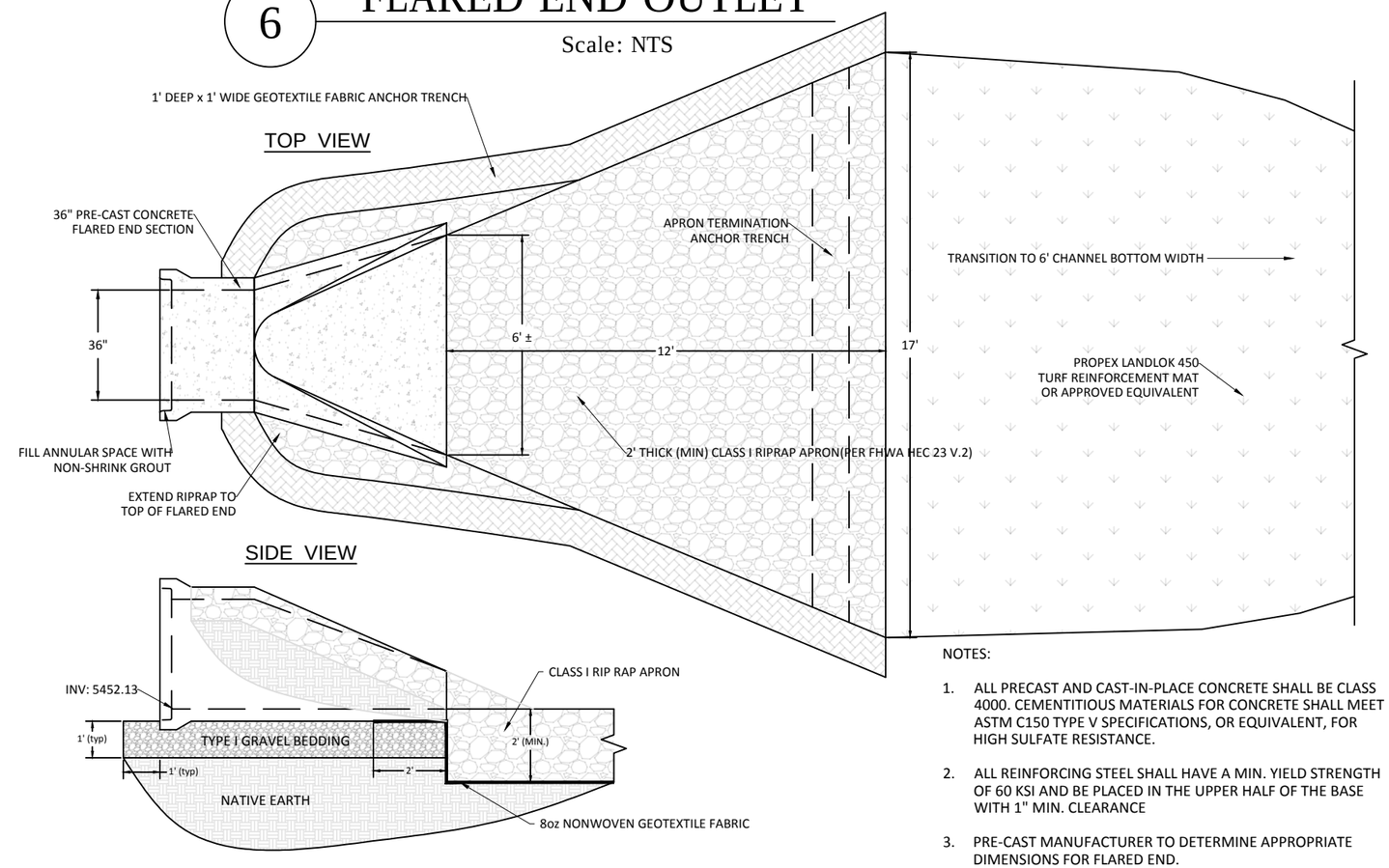
Sieve Size	Type A	Type B		Type C		Job Mix Tolerances
1" (25.0 mm)	100	---		---		---
¾" (19.0 mm)	91-93	100		---		+/- 7
½" (12.5 mm)	76-89	83-93		100		+/- 7
3/8" (9.5 mm)	61-79	73-87		91-93		+/- 7
No 4 (4.75 mm)	41-54	47-63		51-71		+/- 6
No 10 (2.00 mm)	31-39	32-43		34-46		+/- 6
No 40 (0.425 mm)	16-27	15-25		16-26		+/- 5
No 200 (0.075 mm)	4-7	5-7		5-9		+/- 2

NOTES:

1. TYPE 1 PIPE BEDDING MUST CONSIST OF SAND, SANDY GRAVEL, OR GRAVEL HAVING A MAXIMUM 3/4 INCH SIZE AND MAXIMUM PLASTICITY INDEX OF 6 AS DETERMINED BY ASTM D4318

6 FLARED END OUTLET

Scale: NTS



NOTES:

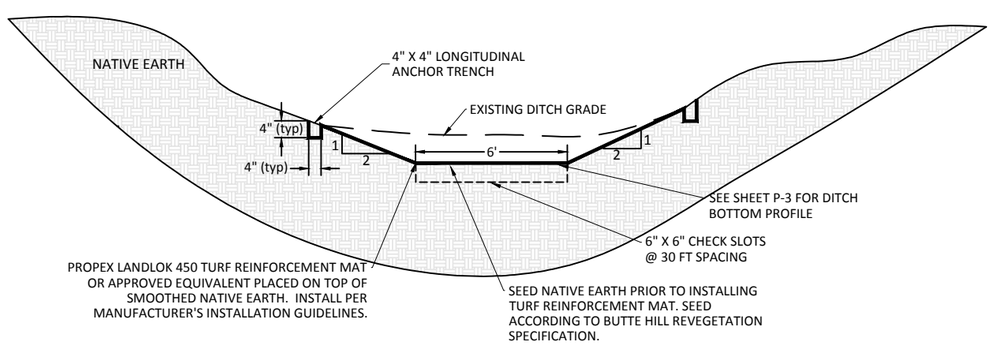
1. ALL PRECAST AND CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. CEMENTITIOUS MATERIALS FOR CONCRETE SHALL MEET ASTM C150 TYPE V SPECIFICATIONS, OR EQUIVALENT, FOR HIGH SULFATE RESISTANCE.
2. ALL REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60 KSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE
3. PRE-CAST MANUFACTURER TO DETERMINE APPROPRIATE DIMENSIONS FOR FLARED END.

RIPRAP GRADATION

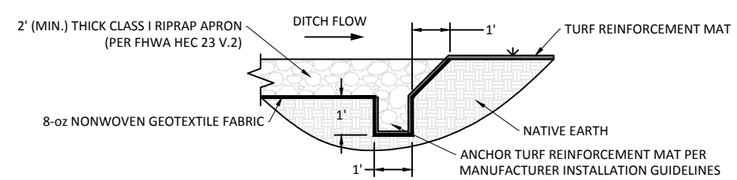
		d15		d50		d85		d100
Class	Size	Min	Max	Min	Max	Min	Max	Max
I	6 in	3.7	5.2	5.7	6.9	7.8	9.2	12.0

7 TYPICAL DITCH RE-GRADE SECTION

Scale: NTS



APRON / TURF REINFORCEMENT MAT TRANSITION



No.	Description	Date
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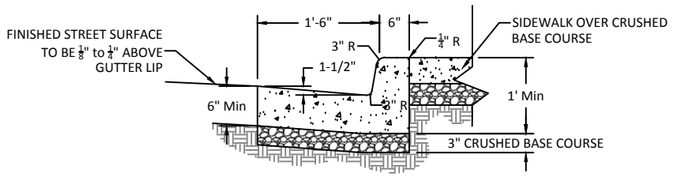
BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
TYPICAL TRENCH & OUTLET DETAIL
BUTTE, MT

SHEET 12 OF 13

D-3

8 CURB AND GUTTER TYPICAL SECTION

Scale: NTS

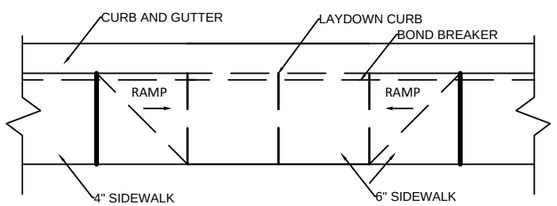


CURB AND GUTTER NOTES:

1. FOR NEW STREET CONSTRUCTION, EXTEND CRUSHED BASE COURSE TO THE BACK OF THE CURB. MINIMUM THICKNESS OF CRUSHED BASE COURSE BENEATH CURB AND GUTTER SHALL BE 3". FOR CURB AND GUTTER REPLACEMENT PROJECTS, PROVIDE A MINIMUM OF 3" OF CRUSHED BASE COURSE BENEATH NEW CURB AND GUTTER.

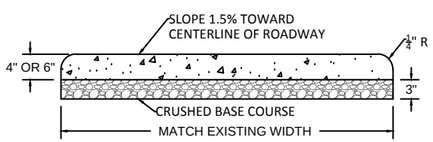
9 TYPICAL SIDEWALK WITH LAYDOWN

Scale: NTS



10 TYPICAL SIDEWALK SECTION

Scale: NTS

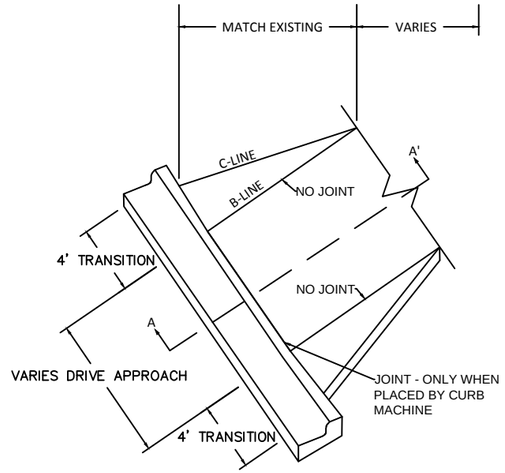


SIDEWALK NOTES:

1. INSTALL PREFORMED EXPANSION JOINT FILLER AT ALL EXPANSION JOINTS, FOR THE FULL THICKNESS OF THE SIDEWALK AND USE AT ALL JOINTS BETWEEN NEW CONCRETE SIDEWALK AND STRUCTURES IN PLACE.
2. INSTALL A BOND BREAKER FOR THE FULL THICKNESS OF THE SIDEWALK AT LOCATIONS SPECIFIED ON THIS DETAIL. USE A 15 OR 30 POUND ROOFING FELT MATERIAL FOR THE BOND BREAKER. DO NOT USE EXPANSION JOINT MATERIAL AS A BOND BREAKER.
3. ALL JOINTS MUST BE STRAIGHT AND PERPENDICULAR TO THE CENTERLINE AND THE SURFACE OF THE SIDEWALK. WHERE PRACTICAL, ALIGN ALL JOINTS WITH LIKE JOINTS IN ADJOINING WORK. USE JOINTS TO OUTLINE ALL PANELS IN THE SIDEWALK, WHICH ARE TO BE, SO FAR AS POSSIBLE, SQUARE. THE LENGTHS OF THE PANELS ARE DETERMINED BY THE WIDTH OF THE SIDEWALK.
4. CONTRACTION JOINTS MAY NOT BE MORE THAN 1/8" WIDE AND NOT LESS THAN 1" IN DEPTH AND MAY BE CUT BY A GROOVE FORMING TOOL.

11 APPROACH LAYDOWN

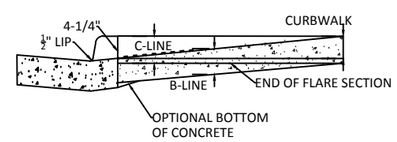
Scale: NTS



APPROACH LAYDOWN NOTES:

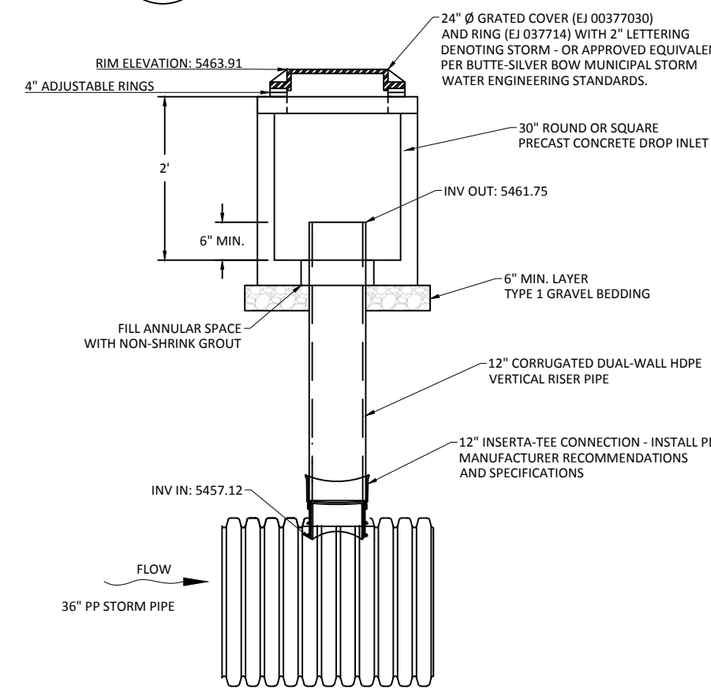
1. APPROACH WILL BE PLACED MONOLITHICALLY EXCEPT WHEN CURB MACHINE IS ALLOWED BY THE ENGINEER WITH DOWELLING 2' ON CENTER, #4 REBAR 2' IN LENGTH.
2. PROVIDE RECTANGULAR JOINT PATTERN DEPENDENT ON WIDTH OF SLABS (NOT TO EXCEED 100 SF SURFACE).

SECTION VIEW A-A'



13 DROP INLET #1

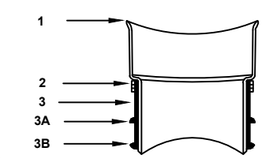
Scale: NTS



12 INSERTA-TEE

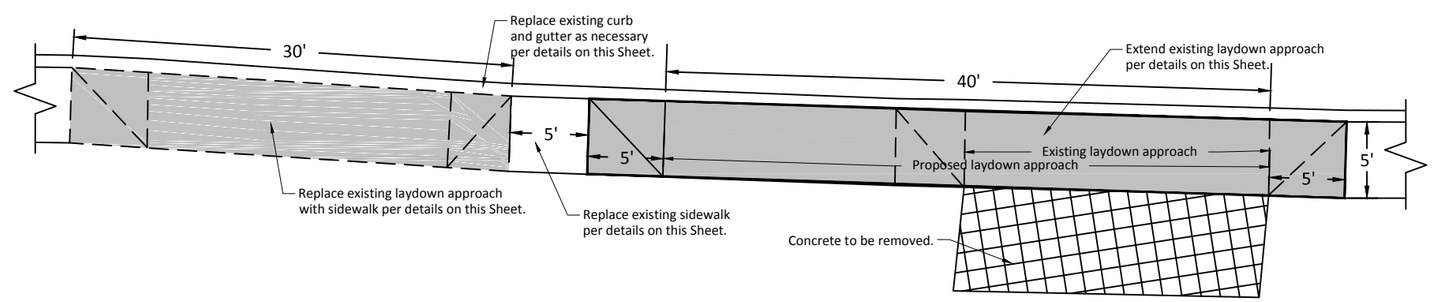
Scale: NTS

PART	PART NAME
1	HUB ADAPTOR
2	SECURING CLAMP OR STAINLESS STEEL BAND
3	RUBBER SLEEVE
3A	UPPER SEGMENT
3B	LOWER SEGMENT
4	(NOT SHOWN) ADS/HANCOR INC. SUPPLIES VALLEY GASKET



14 Kaw Ave Sidewalk/Laydown Layout

Scale: 1"=10'



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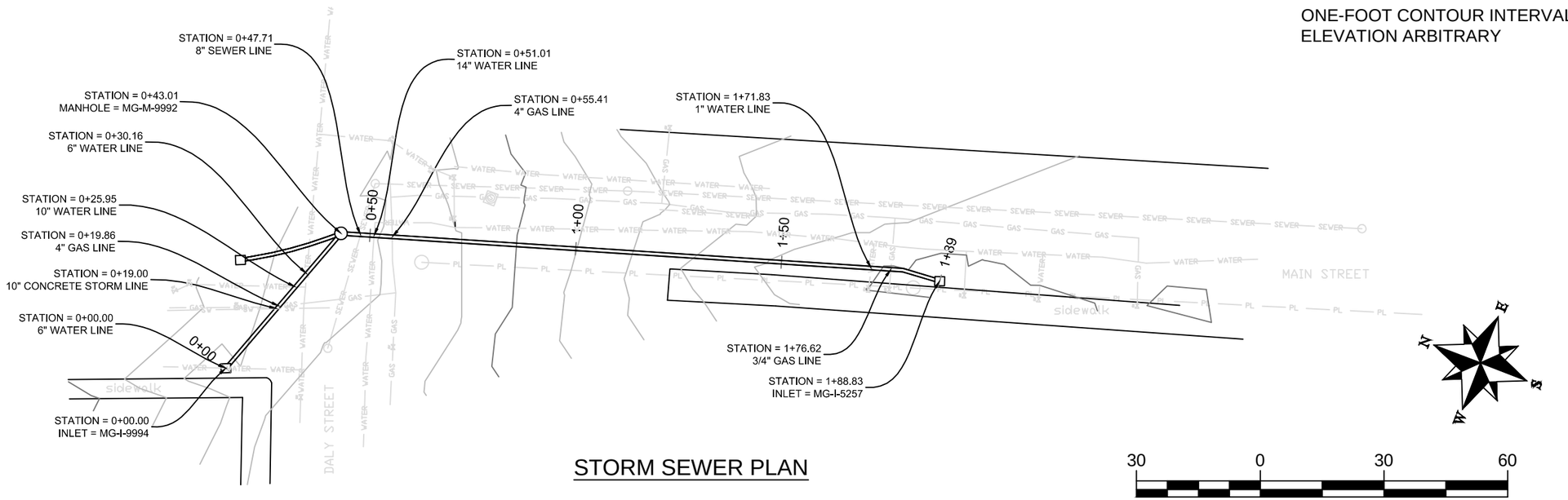
BSB PUBLIC WORKS
KAW AVENUE STORM WATER RE-ROUTE PROJECT
SIDEWALK, LAYDOWN, DI #1
BUTTE, MT

SHEET
13 OF 13

D-4

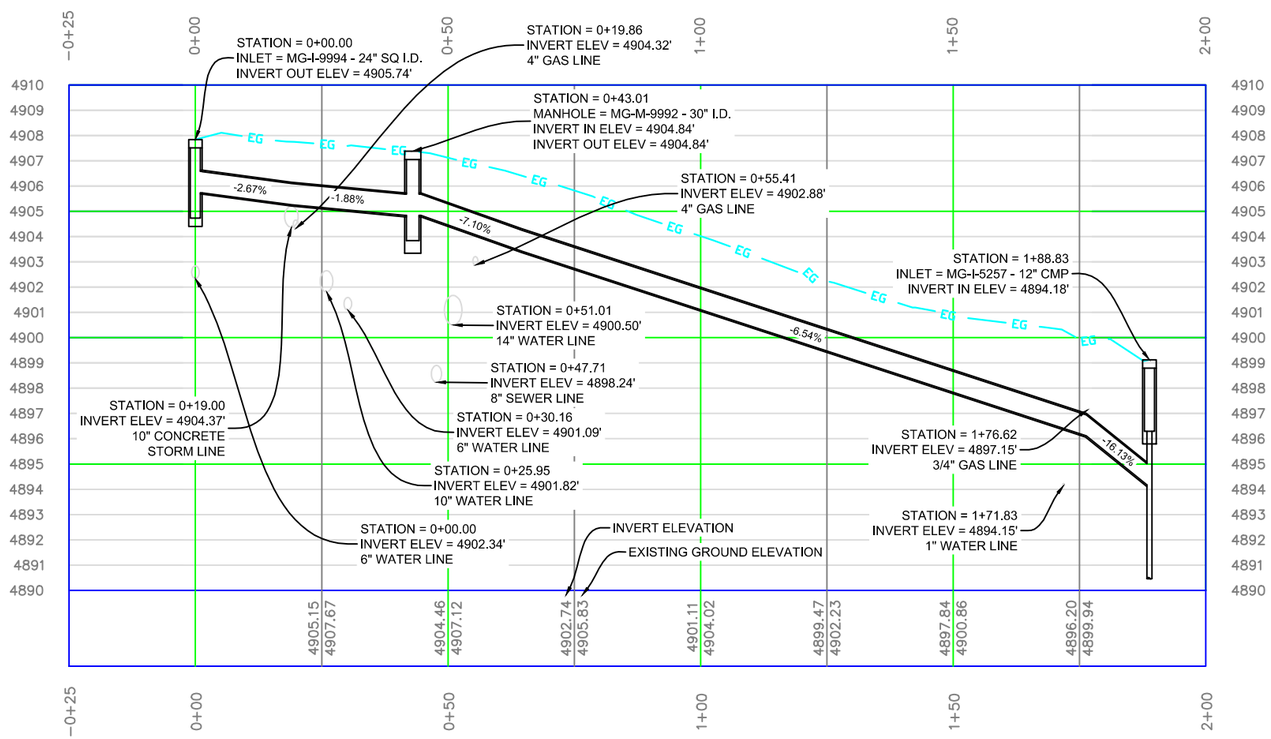
ONE-FOOT CONTOUR INTERVAL
ELEVATION ARBITRARY



STORM SEWER PLAN

30 0 30 60

SCALE: 1 IN = 30 FT



STORM SEWER PROFILE

INLET #1 - INLET #3

SCALE: 1" = 30' HORZ

SCALE: 1" = 6' VERT

LEGEND

WATER	WATER LINE
SEWER	SANITARY SEWER
GAS	GAS LINE
PL	POWER LINE
SW	STORM LINE
EG	EXISTING GROUND

GROUND CONTOURS (1' INTERVALS)

MAJOR CONTOURS

MINOR CONTOURS

MAIN ST & DALY ST STORM WATER LATERALS	
DRAINAGE AREA (ac)	5.42
CURVE NUMBER	88
TIME OF CONCENTRATION, Tc (hr)	0.1
LOCATION OF Tc	INLET #1 & #2
MINIMUM SLOPE	1.88% (ASSUME ALL FLOW TRAVELS TO INLET #1)
PIPE TYPE & DIAMETER	ADS-N-12 WT 10INCH
MAXIMUM CONVEYANCE (cfs)	3.51
MAXIMUM PRECIPITATION (TR-55) TYPE I	1.92 INCHES

NO.	REVISION/ISSUE	DATE

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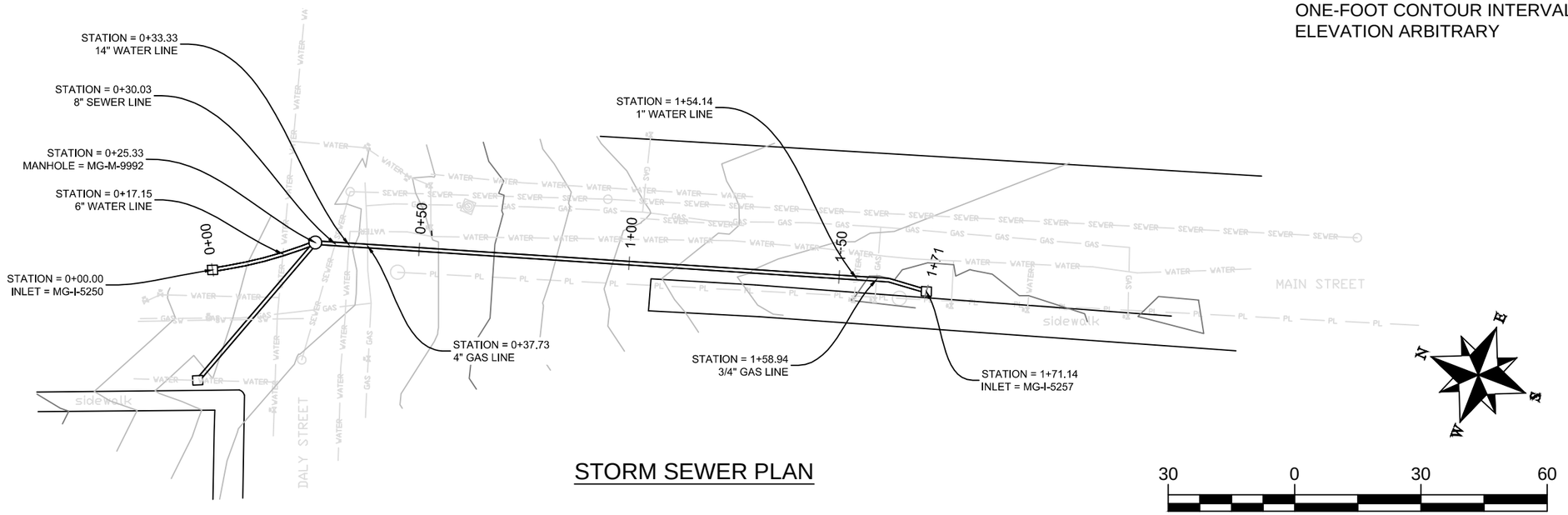
MAIN ST. STORM SEWER DESIGN
BUTTE SILVER BOW
AS-BUILT DRAWINGS
INLET #1 TO INLET #3

BSBPWM16	Sheet 1
12/02/2010	
AS NOTED	

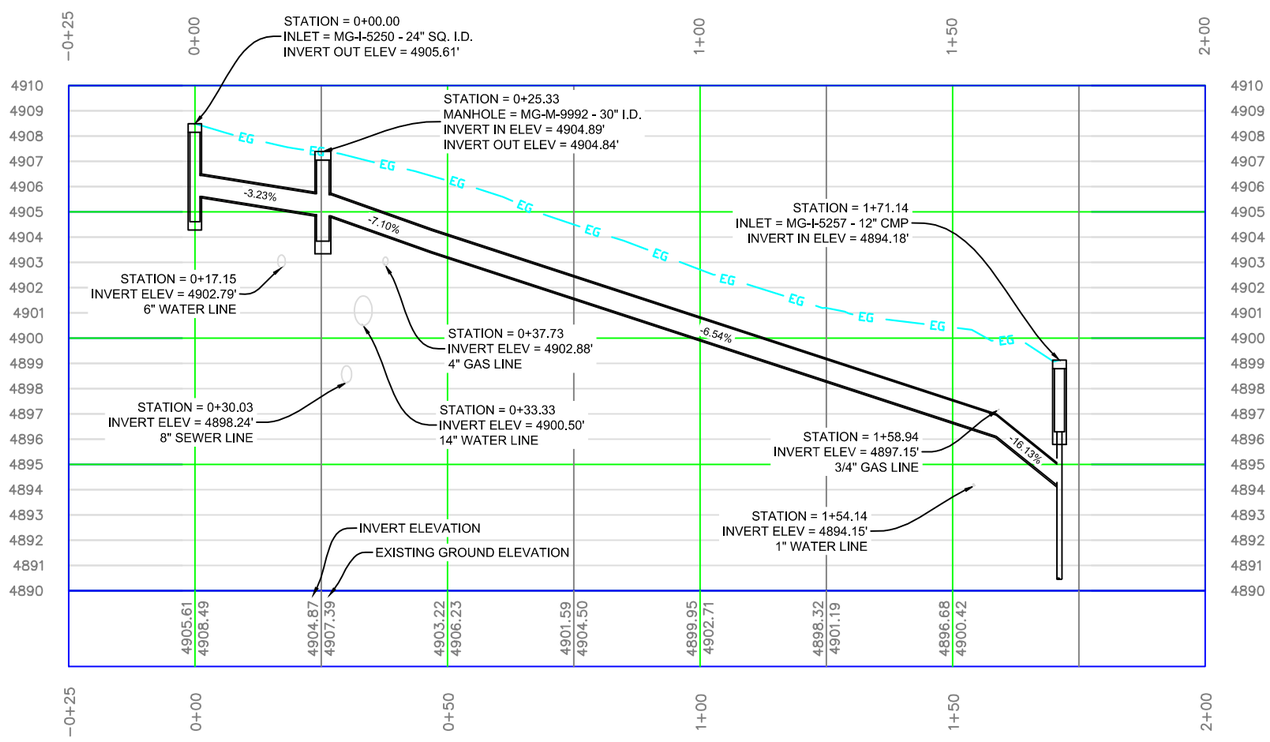
ONE-FOOT CONTOUR INTERVAL
ELEVATION ARBITRARY



STORM SEWER PLAN

30 0 30 60

SCALE: 1 IN = 30 FT



STORM SEWER PROFILE

INLET #2 - INLET #3

SCALE: 1" = 30' HORZ

SCALE: 1" = 6' VERT

LEGEND

WATER	WATER LINE
SEWER	SANITARY SEWER
GAS	GAS LINE
PL	POWER LINE
SW	STORM LINE
EG	EXISTING GROUND

GROUND CONTOURS (1' INTERVALS)

MAJOR CONTOURS

MINOR CONTOURS

MAIN ST & DALY ST STORM WATER LATERALS	
DRAINAGE AREA (ac)	5.42
CURVE NUMBER	88
TIME OF CONCENTRATION, Tc (hr)	0.1
LOCATION OF Tc	INLET #1 & #2
MINIMUM SLOPE	1.88% (ASSUME ALL FLOW TRAVELS TO INLET #1)
PIPE TYPE & DIAMETER	ADS-N-12 WT 10INCH
MAXIMUM CONVEYANCE (cfs)	3.51
MAXIMUM PRECIPITATION (TR-55) TYPE I	1.92 INCHES

NO.	REVISION/ISSUE	DATE

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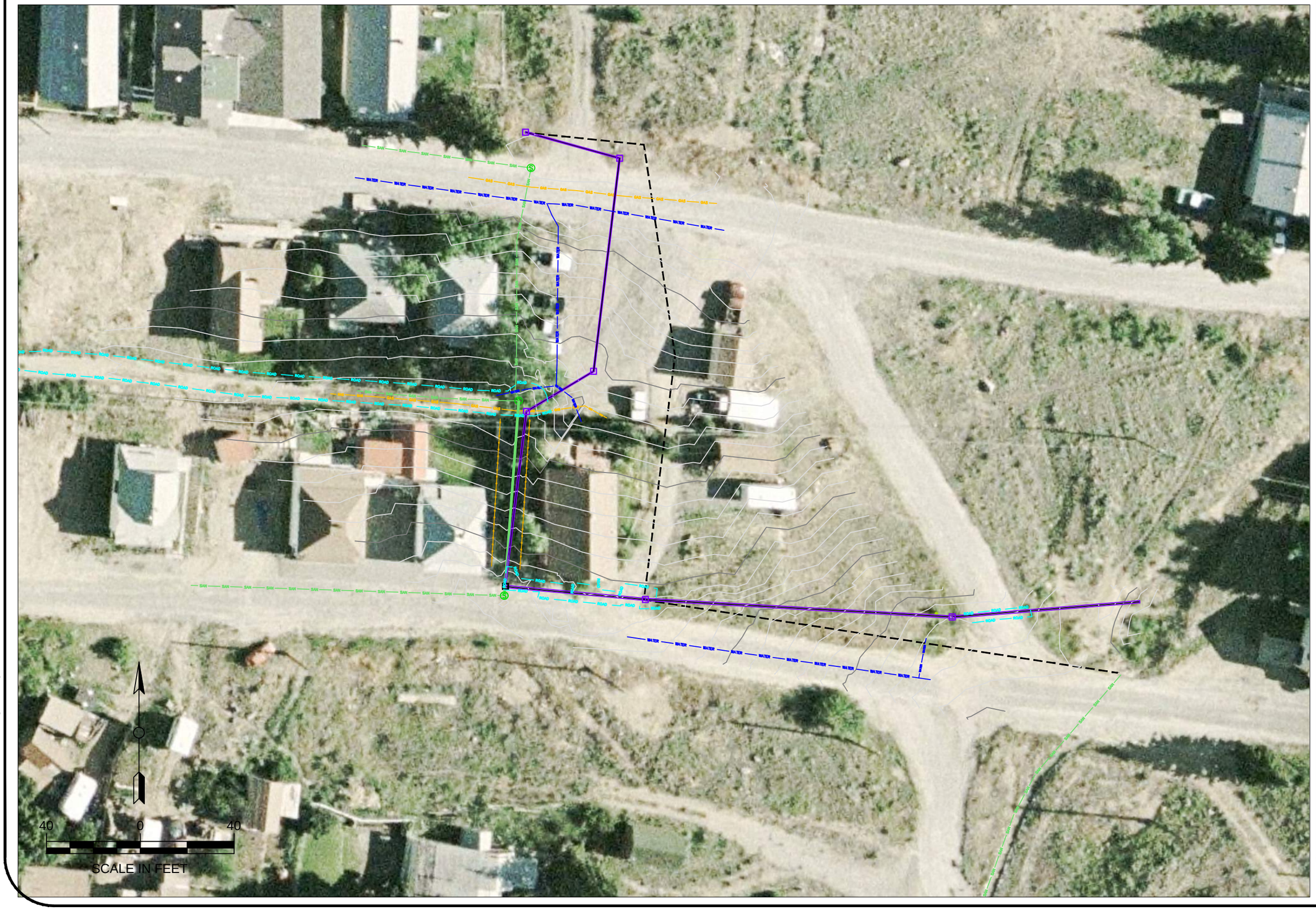
MAIN ST. STORM SEWER DESIGN
BUTTE SILVER BOW
AS-BUILT DRAWINGS
INLET #2 TO INLET #3

BSBPWM16	Sheet 2
12/02/2010	
AS NOTED	

O'NEILL ST & BENNETT ST
SITE MAP
STA: 0+00 - 5+00.28



LEGEND

- ORIGINAL STORM SEWER DESIGN
- NEW STORM SEWER INLET
- NEW STORM SEWER SDR-35
- WATER
- SANITARY SEWER
- GAS
- FENCE
- GROUND
- NEW PAVEMENT
- NEW RETAINING WALL

GROUND CONTOURS (1' INTERVALS)

- MAJOR CONTOURS
- MINOR CONTOURS

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BUTTE-SILVER BOW
O'NEILL & BENNETT STREET
WALKERVILLE, MT
SITE PLAN/LAYOUT

BSBPWM17	Sheet C-1*AB*
1/31/2013	
AS NOTED	

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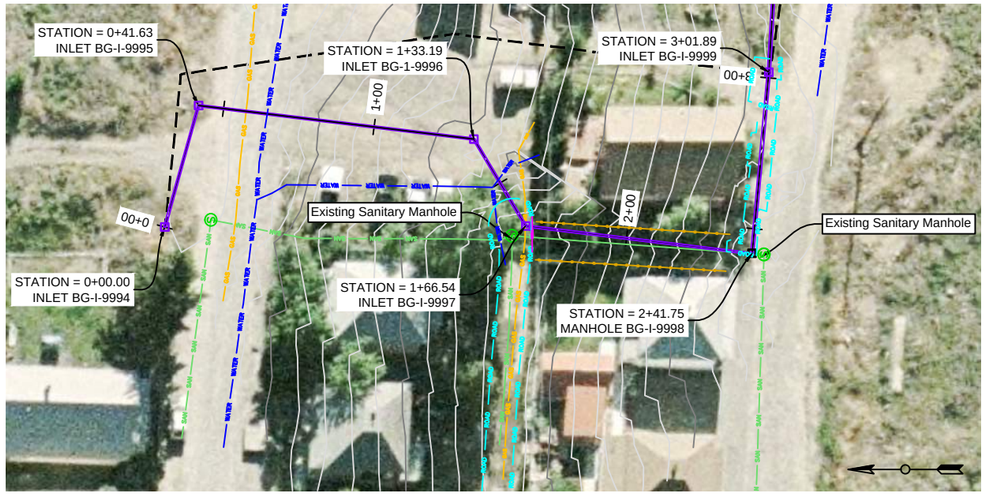
O'NEILL ST & BENNETT ST
STORM SEWER AS-BUILT PLAN

STA: 0+00 - 3+00.00



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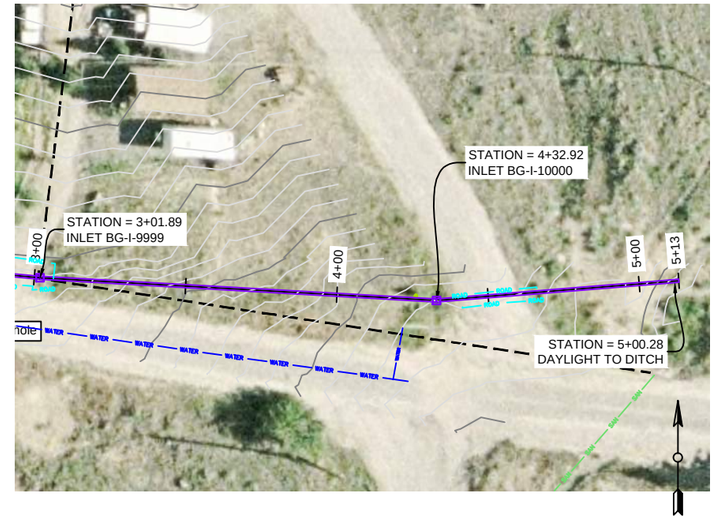

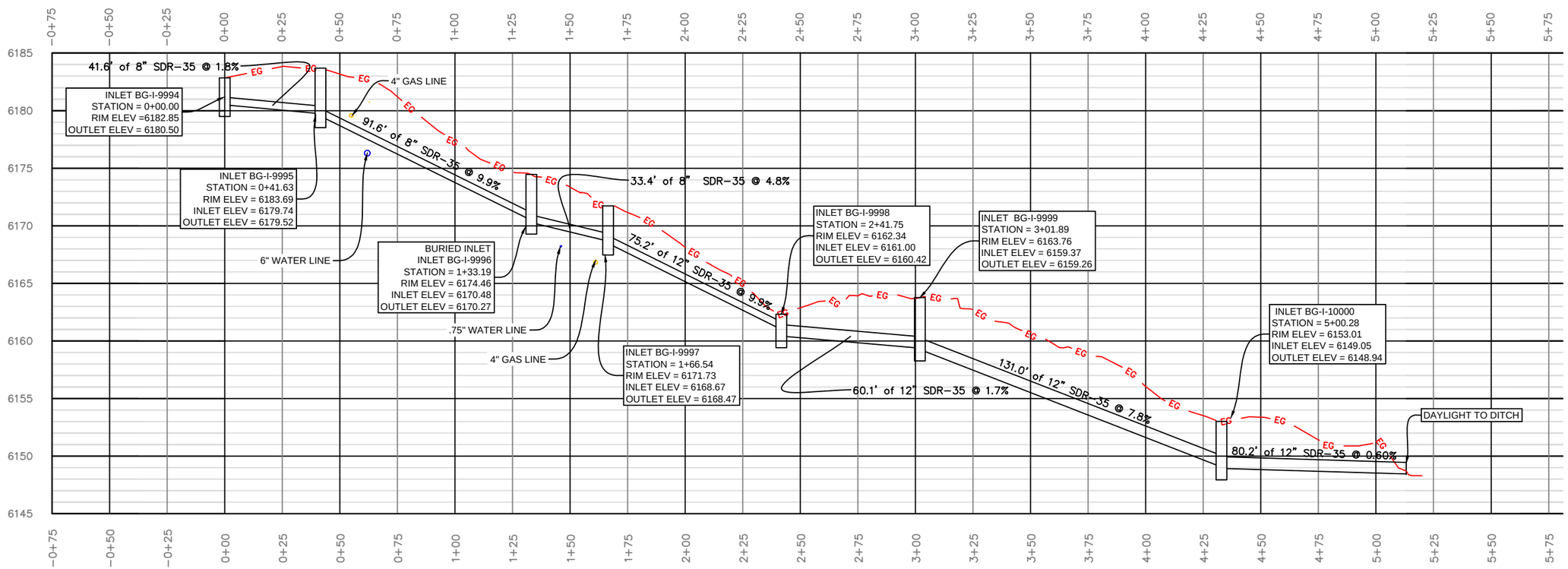

STORM SEWER AS-BUILT PROFILE

STA: 0+00 - 5+00.28

SCALE: 1" = 50' HORZ
SCALE: 1" = 10' VERT

50 0 50

SCALE IN FEET

LEGEND

- ORIGINAL STORM SEWER DESIGN
- NEW STORM SEWER INLET
- NEW STORM SEWER SDR-35
- WATER
- SANITARY SEWER
- GAS
- FENCE
- GROUND
- NEW PAVEMENT
- NEW RETAINING WALL

GROUND CONTOURS (1' INTERVALS)

- MAJOR CONTOURS
- MINOR CONTOURS

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BUTTE–SILVER BOW
O'NEILL & BENNETT STREET
WALKERVILLE, MT
STORM SEWER
PLAN & PROFILE AS–BUILT

BSBPWM17	Sheet
1/31/2013	P-1AB
AS NOTED	

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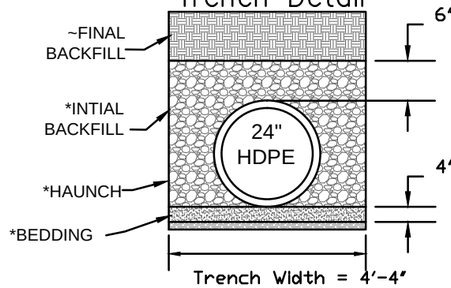
Pacific Street Storm Water Replacement

Trench Detail



6" per Public Works Standard 02221 Section 3.6 B 2.a

4" per Public Works Standard 02221 Section 3.6 B 1.a

Trench Width = 4'-4' Minimum per Public Works Standard 02221 - Section 3.3 B 2.a

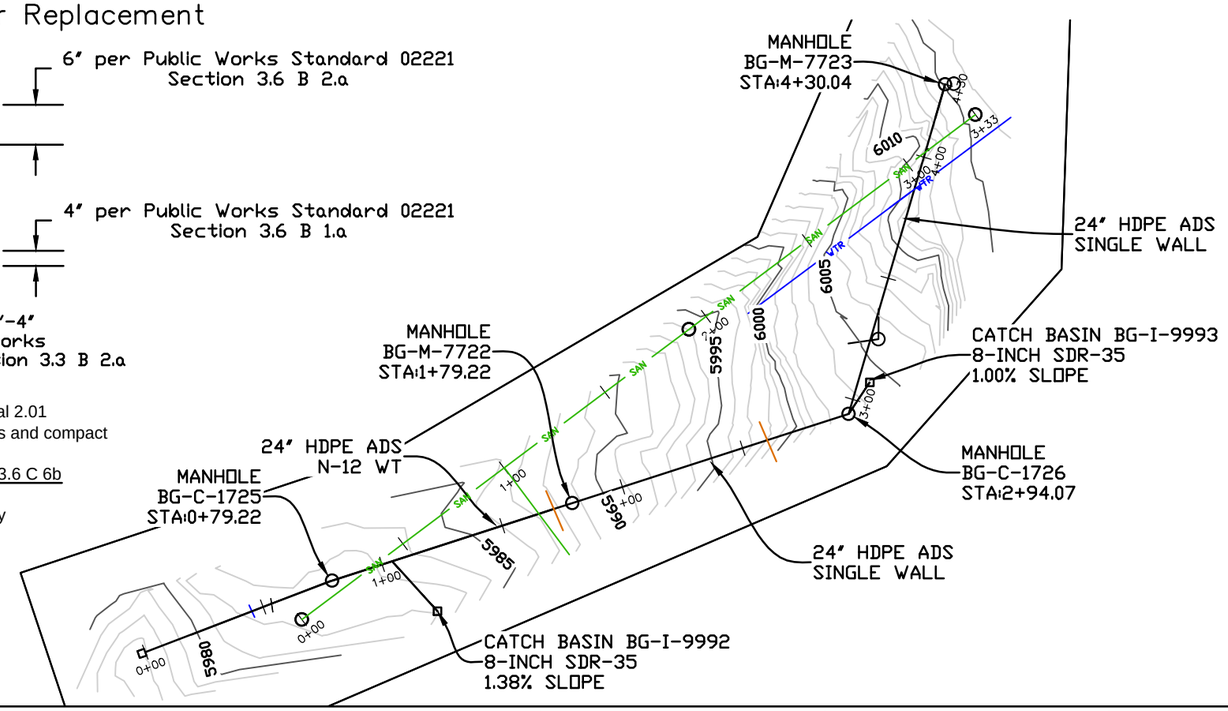
* "BSB Plant Mix" Maximum 6-inch lifts Compact to 90% or better. - per ADS Technical 2.01

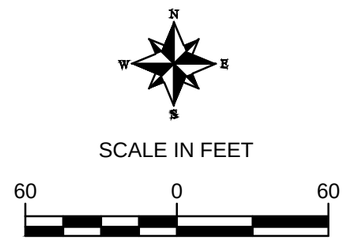
~FINAL BACKFILL - Place backfill in 8-inch lifts and compact thoroughly.

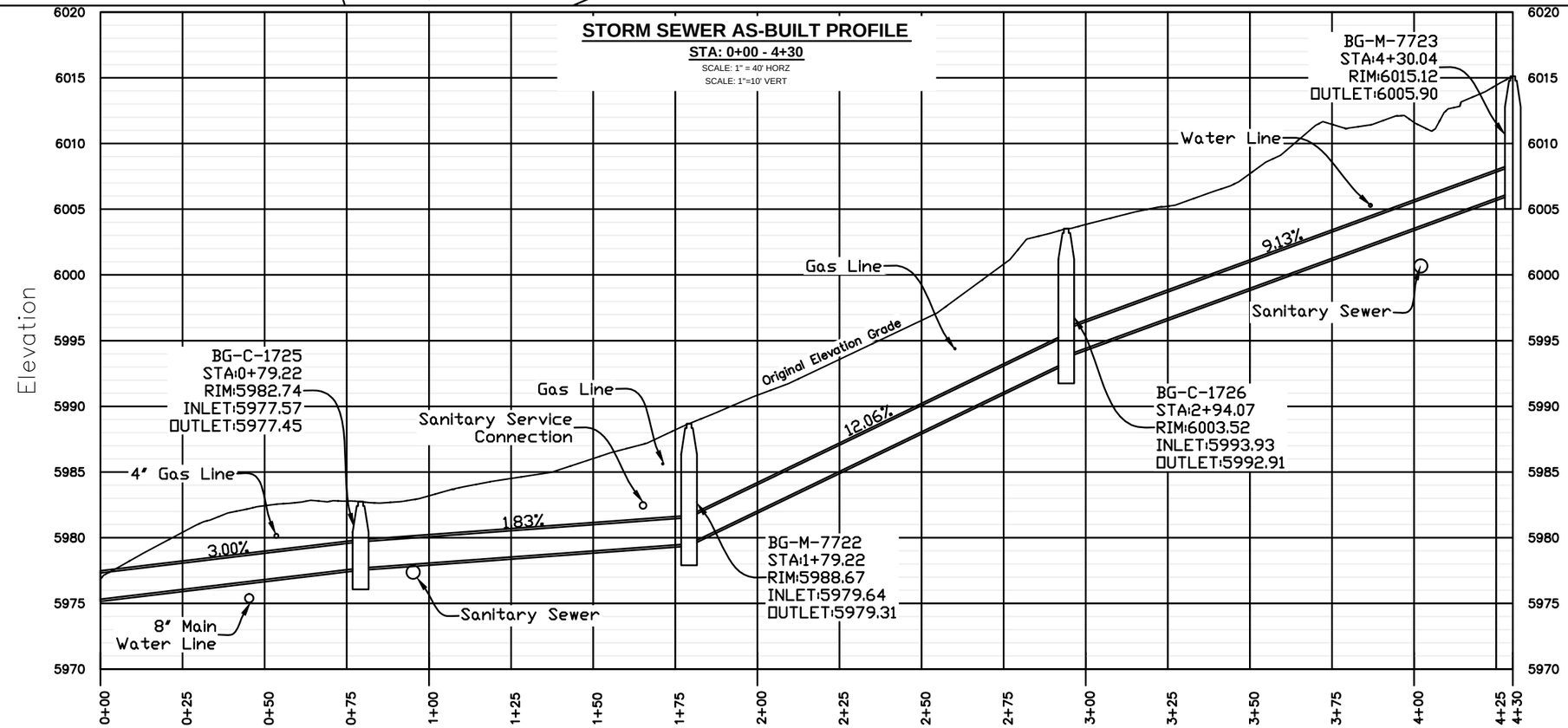
Public Works Standards 02221 Requirements 3.6 C 6b

-Within 3% optimum moisture content

-Compact to at least 90% maximum dry density







LEGEND

- Storm 2' Diam. HDPE
- SAN — Sanitary Sewer Main
- WTR — Water Line
- GAS — Gas Line

Local Coordinate System Used

No.	Revision/Issue	Date

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

BUTTE SILVER BOW
E. PACIFIC STREET & MAIN STREET
WALKERVILLE, MT
STORM SEWER
PLAN & PROFILE AS-BUILT

BSBPM13	Sheet
3/11/2013	P-1AB
As Noted	

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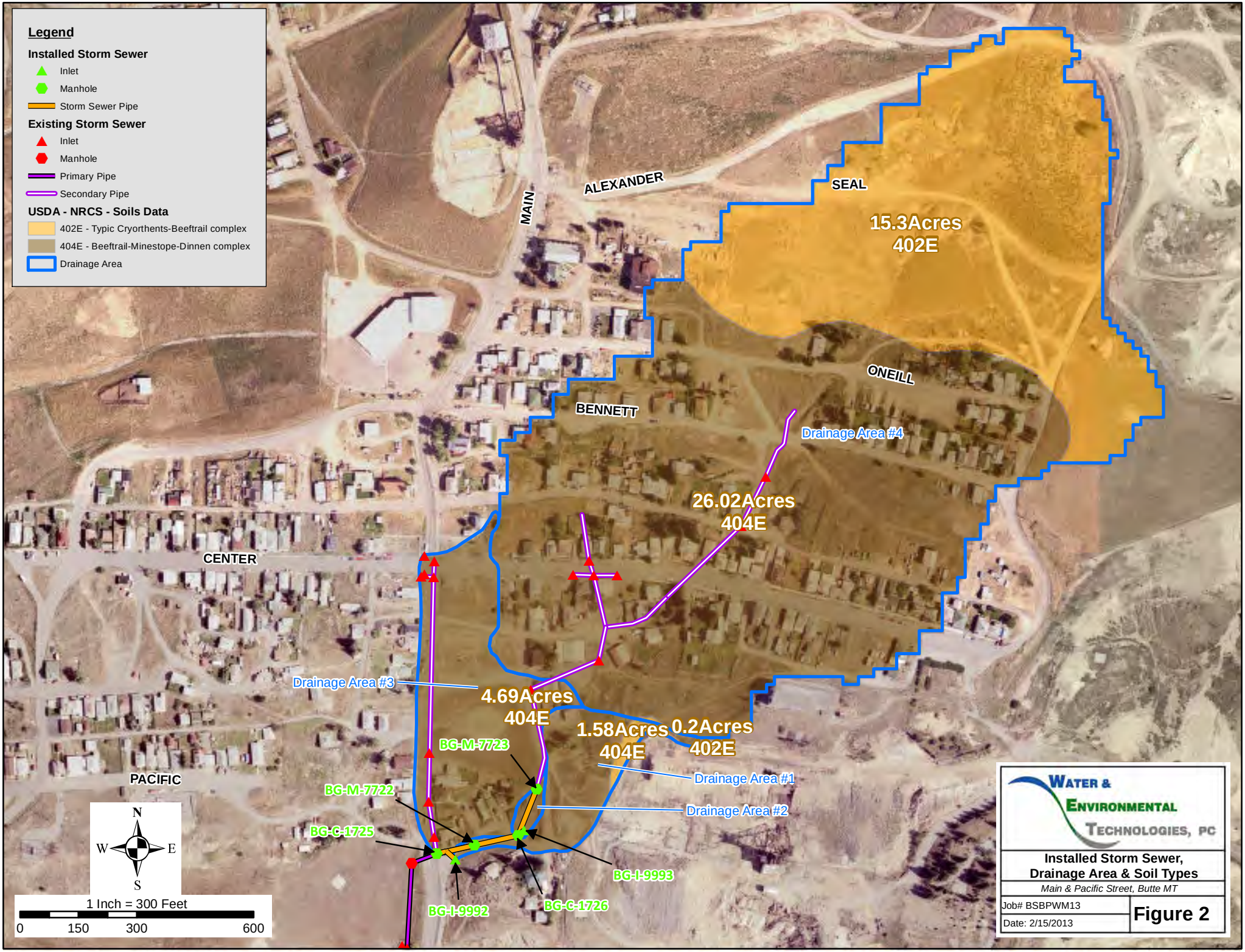
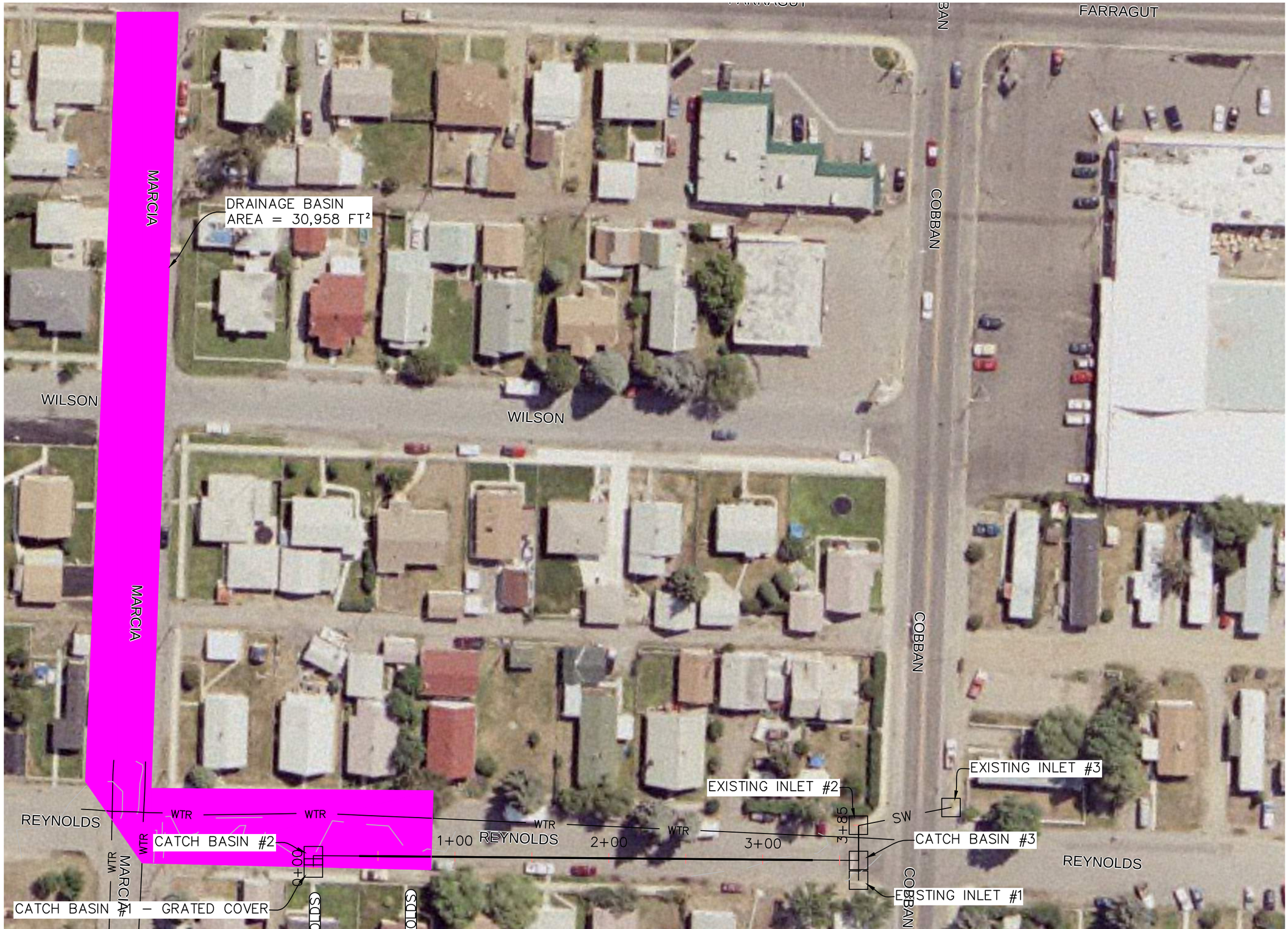

Legend
Installed Storm Sewer
Inlet
Manhole
Storm Sewer Pipe
Existing Storm Sewer
Inlet
Manhole
Primary Pipe
Secondary Pipe
USDA - NRCS - Soils Data
402E - Typic Cryorthents-Beeftrail complex
404E - Beeftrail-Minestope-Dinnen complex
Drainage Area
ALEXANDER
MAIN
SEAL
15.3Acres
402E
ONEILL
BENNETT
Drainage Area #4
26.02Acres
404E
CENTER
Drainage Area #3
4.69Acres
404E
1.58Acres
404E
0.2Acres
402E
BG-M-7723
Drainage Area #1
PACIFIC
BG-M-7722
Drainage Area #2
BG-C-1725
BG-I-9993
BG-I-9992
BG-C-1726
N
W
E
S
1 Inch = 300 Feet
0
150
300
600
WATER & ENVIRONMENTAL TECHNOLOGIES, PC
Installed Storm Sewer,
Drainage Area & Soil Types
Main & Pacific Street, Butte MT
Job# BSBPWM13
Date: 2/15/2013
Figure 2



No.	Revision/Issue	Date

BUTTE-SILVER BOW
5-2-77
THE RICHEST HILL ON EARTH
STATE OF MONTANA

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Suite 200
480 E. Park Street
Butte, MT 59701
(406)-782-5220

Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

SCALE 1" = 60'

0 30 60

JOB # BSBPWM55
DATE: 2/10/2014
DESIGNER: A.G.F.
CHK'D BY: K.S.

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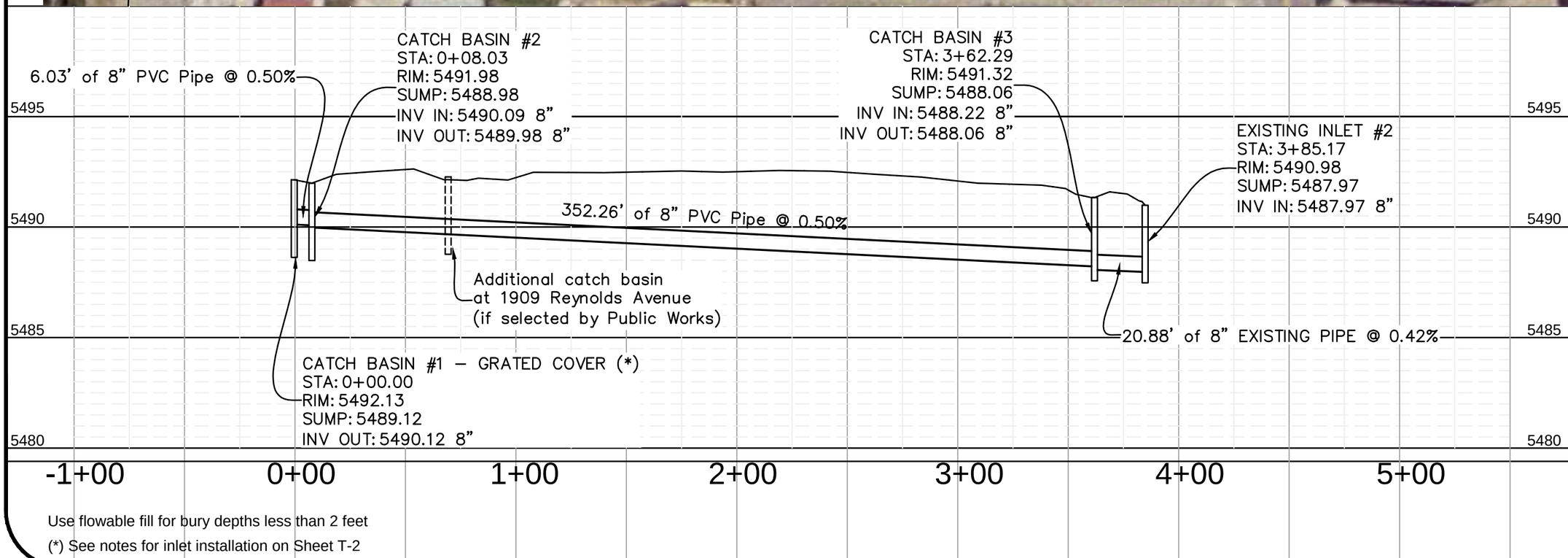
BSB PUBLIC WORKS
REYNOLDS AVENUE STORM UPGRADE

SITE LAYOUT

BUTTE, MT 59701

SHEET
3 of 4

C-1



Use flowable fill for bury depths less than 2 feet

(*) See notes for inlet installation on Sheet T-2

No.	Revision/Issue	Date

BUTTE-SILVER BOW
5-2-77
THE RICHEST HILL ON EARTH
STATE OF MONTANA

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480 E. Park Street
Butte, MT 59701
(406)-782-5220
Suite 103
1321 8th Ave N.
Great Falls, MT 59401
(406)-782-5220

SCALE 1" = 50'

JOB # BSBPWM55
DATE: 2/10/2014
DESIGNER: A.G.F.
CHK'D BY: K.S.

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REYNOLDS AVENUE STORM UPGRADE

PLAN & PROFILE

BUTTE, MT 59701

SHEET
4 of 4

P-1

Attachment B

HydroCAD Diagrams

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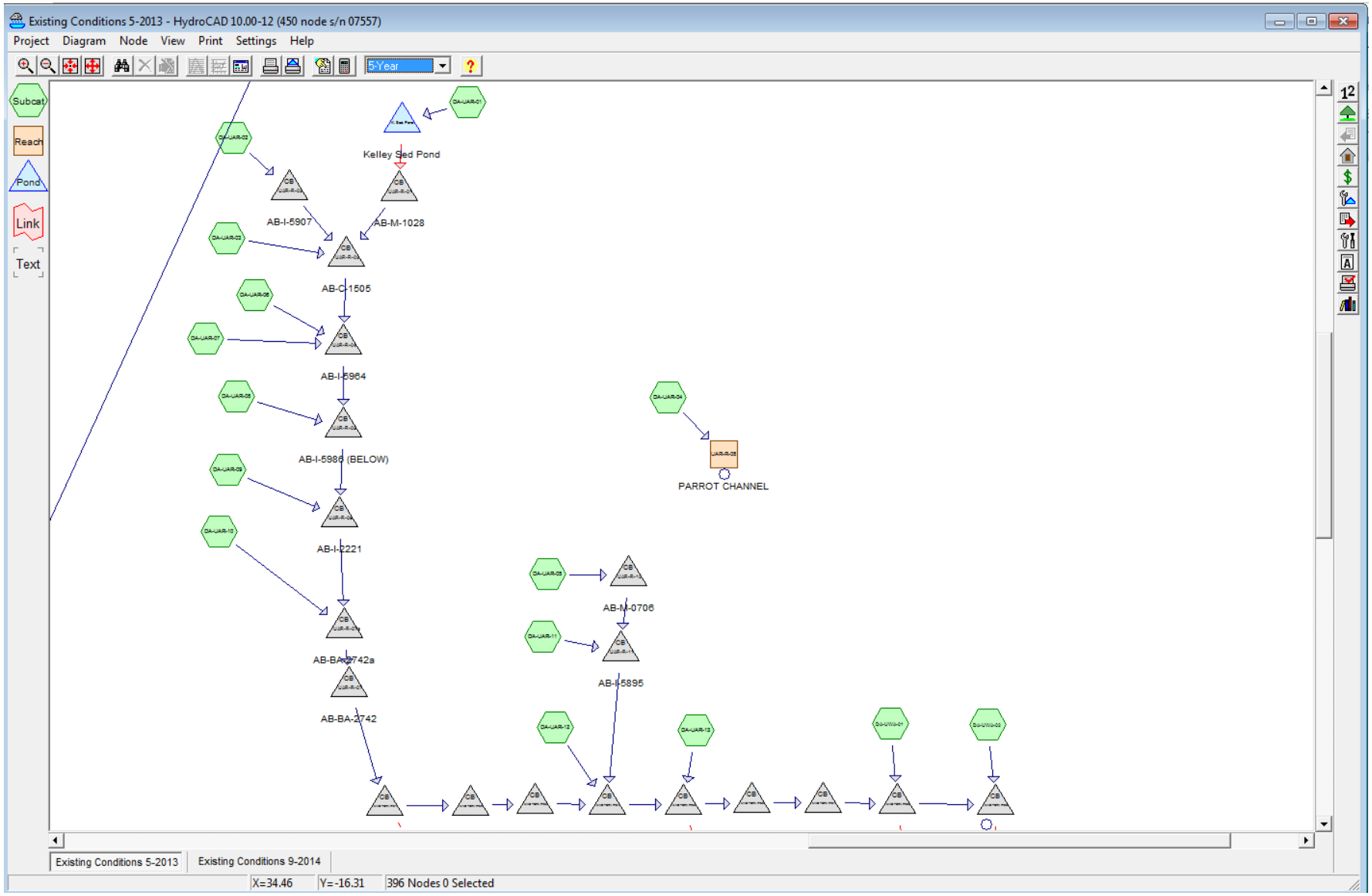
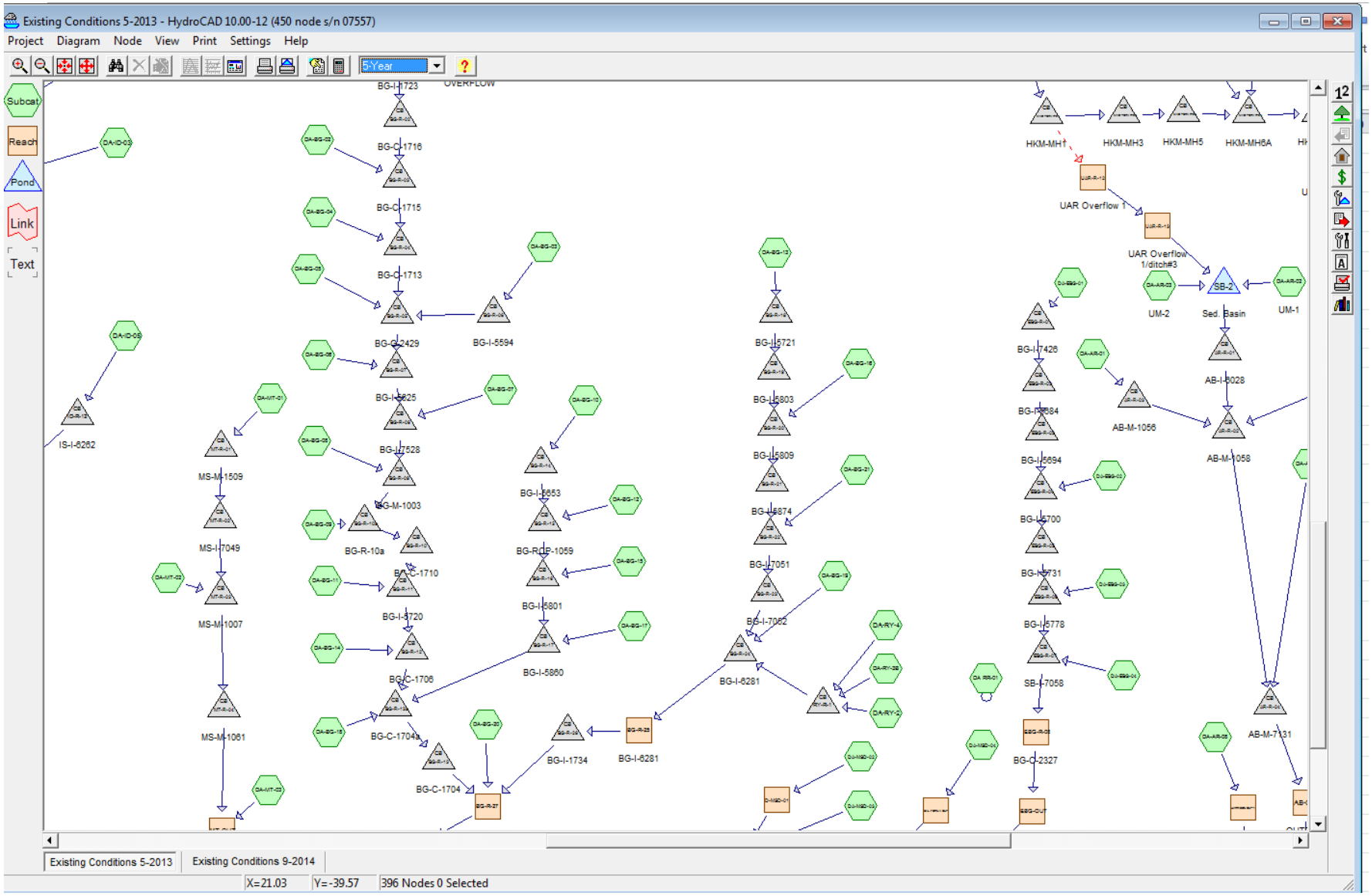
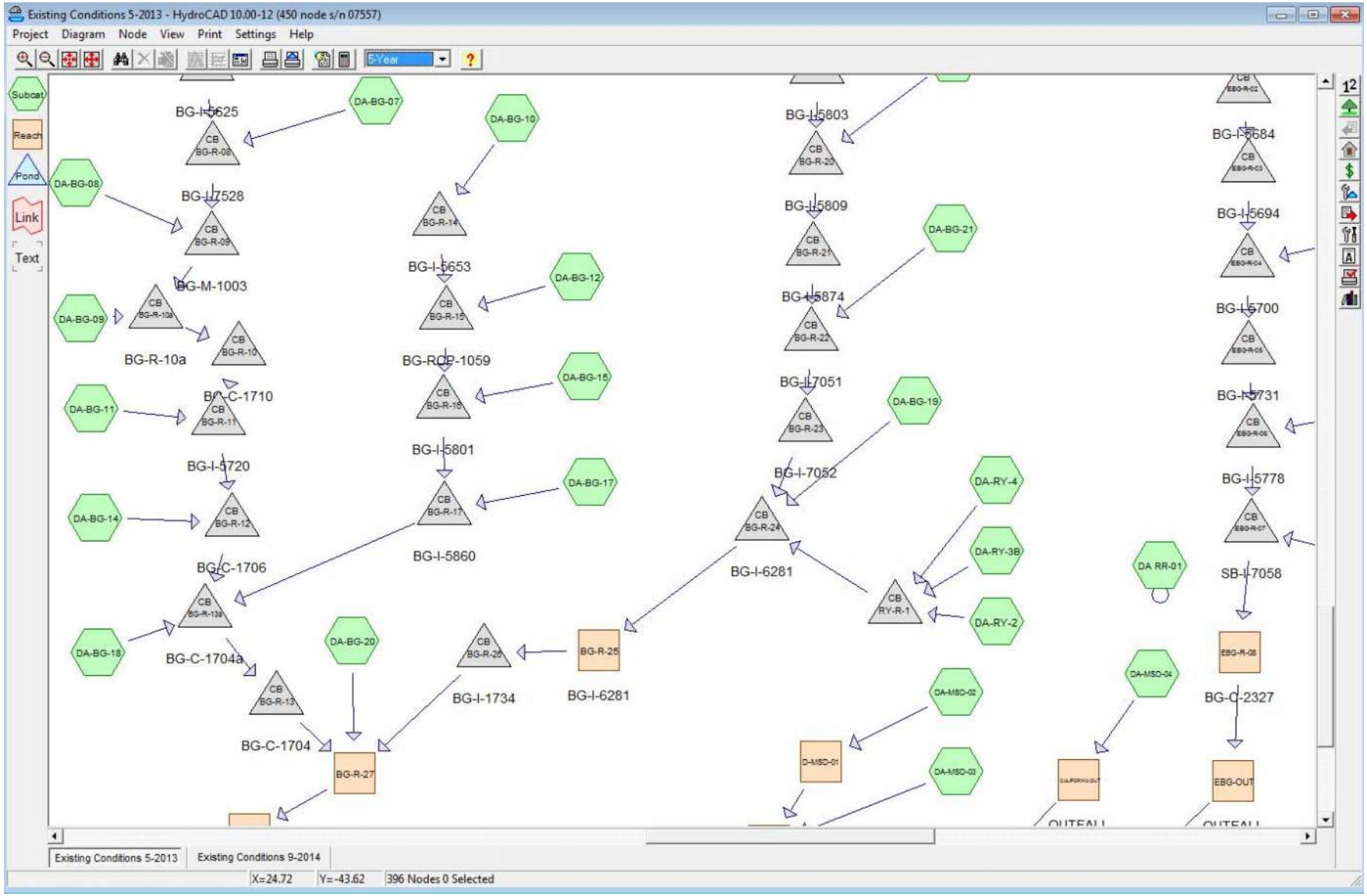
May 2013 Existing Condition Model Diagram – Anaconda Road Trunk Lining



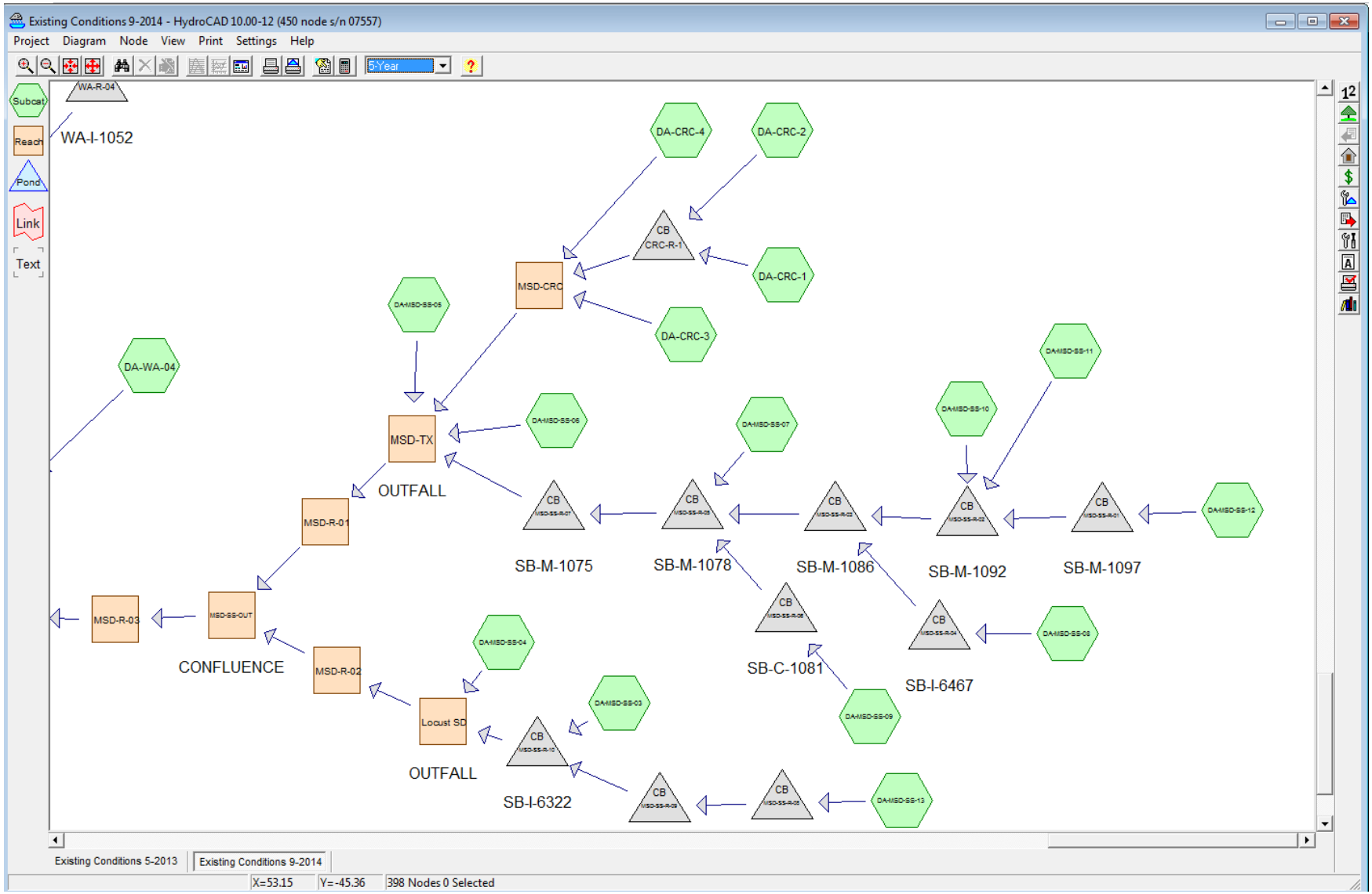
May 2013 Existing Condition Model Diagram – Buffalo Gulch Trunk Lining



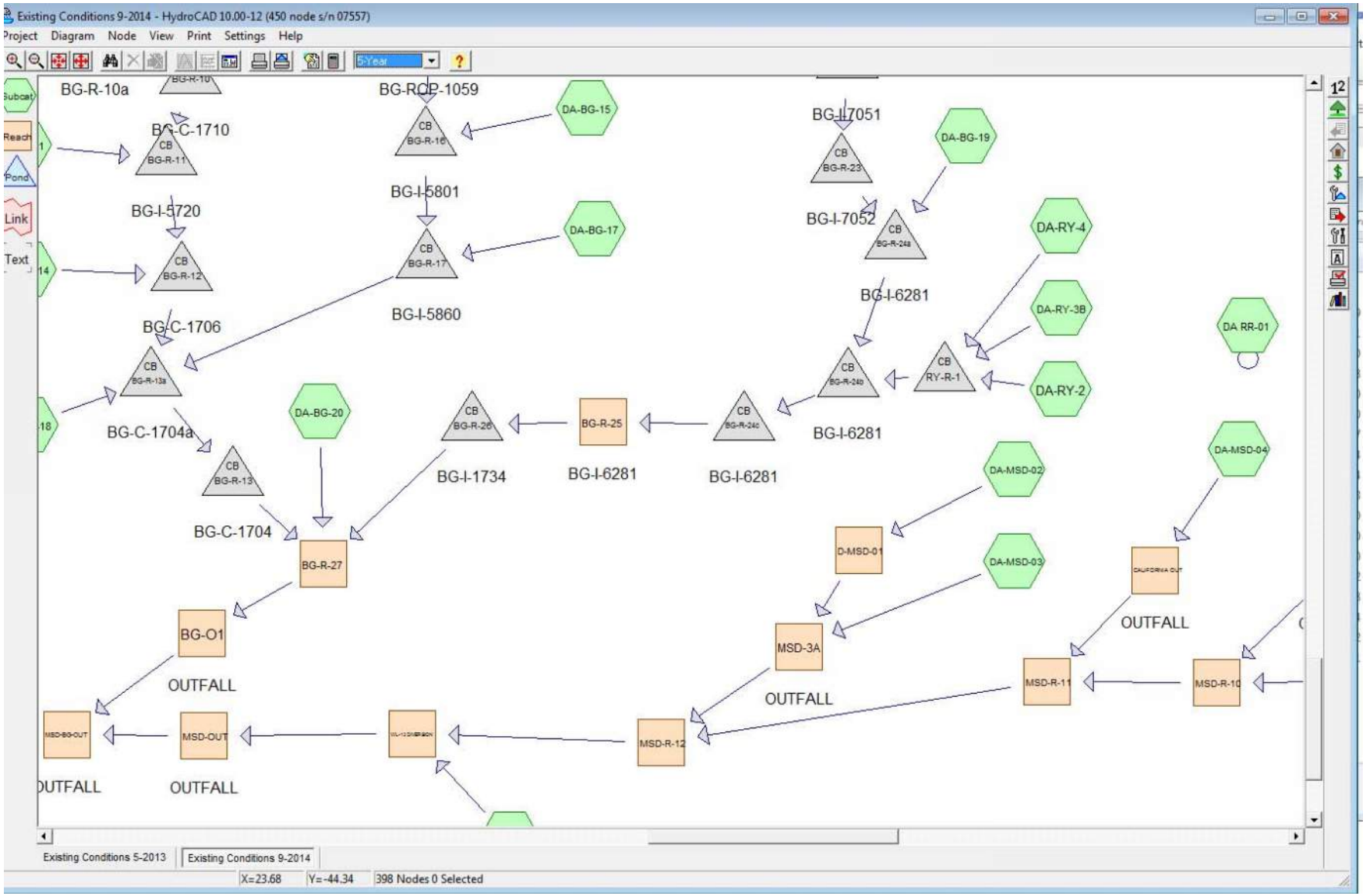
May 2013 Existing Condition Model Diagram – Railroad Yard Addition



September 2014 Existing Condition Model Diagram – Continental Channel



September 2014 Existing Condition Model Diagram – Kaw Avenue Reroute



Attachment C

September 2014 Existing Condition HydroCAD Model

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APPENDIX D2

Technical Memo 2:
Butte Priority Soils Operable Unit Technical Elements and HydroCAD Modeling Assumptions

Atlantic Richfield Company
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February 10, 2015

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RE: Technical Memo 2: Butte Priority Soils Operable Unit (BPSOU) Technical Elements and HydroCAD Modeling Assumptions

Ladies and Gentlemen:

Atlantic Richfield Company is submitting *Technical Memo 2: Butte Priority Soils Operable Unit (BPSOU) Technical Elements and HydroCAD Modeling Assumptions* for your review, approval, and use in the surface water technical impracticability evaluation effectiveness modeling. We are providing the initial version of this memorandum on the electronic file transfer protocol (ftp) site "ShareFile." In addition, hard copies of the memorandum with electronic appendices on a CD will be provided to the EPA and DEQ.

Atlantic Richfield has not received final comments on our *Storm Water TI Assumptions And Efficiency Matrix for Technical Elements* (January 21, 2015). However, the attached Memo has been prepared in accordance with the assumptions put forth in that Matrix.

If you have questions or concerns, please do not hesitate to call me at (406) 723-1826.

Sincerely,

Loren Burmeister
Operations Project Manager

cc: Julie DalSoglio (EPA)
Joe Vranka (EPA)
Sara Sparks (EPA)
Nikia Greene (EPA)
Henry Elsen (EPA Legal Counsel)
David Shanight (EPA Consultant)
Derek Wintle (EPA Consultant)
Chapin Storrar (EPA Consultant)
Curt Coover (EPA Consultant)
Jim Freeman (DOJ)
Tom Livers (DEQ)
Jon Morgan (DEQ Legal Counsel)
Jenny Chambers (DEQ)
Tom Stoops (DEQ)
Joe Griffin (DEQ)
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Jim Ford (NRD Consultant)
Mollie Maffie (BSB Legal Counsel)
Eilleen Joyce (BSB Legal Counsel)
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Lorri Birkenbuel (Atlantic Richfield)
Patricia Gallery (Atlantic Richfield)
Cord Harris (Atlantic Richfield)
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George Austiguy (AR Consultant)
Chad Bailey (AR Consultant)
Josh Bryson (AR Consultant)
Craig Deeney (AR Consultant)
Scott Bradshaw (AR Consultant)

File: 70.04.110.1 (w/o attachment)
Library – 1 electronic copy to ann.baranowski@bp.com

Draft Memo

To: Loren Burmeister (Atlantic Richfield)

From: Chad Bailey (Pioneer)

CC: George Austiguy, Mike Borduin (Pioneer)

Date: 2/10/2015

Re: Technical Memorandum 2: BPSOU Technical Elements and HydroCAD Modeling Assumptions

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Objectives

This *Technical Memorandum 2: BPSOU Technical Elements and HydroCAD Modeling Assumptions* (Tech Memo 2) supports the 2014 BPSOU Storm Water Technical Impracticability (TI) evaluation (TI evaluation). The TI evaluation is being conducted to assess the potential effectiveness of select Technical Elements (TEs) in lowering contaminants of concern (COCs) concentrations within Silver Bow Creek (Table 1). The objective of Tech Memo 2 is to provide assumptions for each TE, a summary of how each TE was incorporated into HydroCAD, and an updated Final Existing Conditions 2014 model that incorporates select TEs.

It should be noted that Tech Memo 2 provides assumptions and HydroCAD model updates for TE2 (Diversion of Buffalo Gulch via the Belmont Extension), TE4 (Detention/Retention Basins), and TE6 (hydrodynamic device [HD]) (Table 1). Tech Memo 2 also provides assumptions for TE8 (Replace Buried Trunk Lines), TE10 (Capture and Treat First Flush Basins), and TE13 (HD Filters), but these TEs did not require any updates to the HydroCAD model. Furthermore, as per the regularly scheduled BPSOU Storm Water TI meeting held on January 27, 2015, Tech Memo 2 does not provide any assumptions or HydroCAD modifications for TE7 (Additional Source Controls), TE9 (Low Impact Development), TE11 (Diversion of Metro Storm Drain [MSD] Storm Water to the Berkeley Pit), or TE12 (Storm Water Maintenance Program) (Table 1). It is Atlantic Richfield's understanding that the Environmental Protection Agency (EPA) and CDM-Smith will provide assumptions on these TEs for review by the group and also make any necessary modifications to the HydroCAD model to incorporate these TEs.

Background

On January 15, 2015, the *Updated BPSOU Final Existing Conditions 2014 HydroCAD Model* was provided to the Agencies as an attachment to the *Revised Technical Memorandum 1 - Updated BPSOU Existing Conditions HydroCAD Model (*Pioneer Technical Services. Inc. [Pioneer], 2015). The updated HydroCAD model is based on current National Resources Conservation Service (NRCS) hydrologic soil groups (HSGs) (NRCS, 2013) and Curve Numbers (CNs) provided by CDM-Smith, and replaces the version provided to the Agencies on October 6, 2014. In general, the updated HSGs increase CN values in some areas, which in turn cause runoff to occur more rapidly.

On January 21, 2015, the *Storm Water TI Revised Assumptions and Efficiency Matrix* was provided to the Agencies via e-mail correspondence. This table matrix replaces the October 6, 2014, *Assumptions Table for Technical Elements Modeling* provided to the Agencies via e-mail correspondence from Loren Burmeister. The January 21 version has been updated with comments received from EPA and Montana Department of Environmental Quality (DEQ) during the October 14 and October 28, 2014, TI meetings and written comments provided on December 17 and December 18, 2014. An abbreviated version of the matrix (with the efficiency column removed) is provided in Table 1.

Overview

Using the assumptions provided in Table 1, the Final Existing Conditions 2014 model has been updated with TE2 (Diversion of Buffalo Gulch via Belmont Extension), TE4 (Detention/Retention Basins, and TE6 (HD). Several TEs did

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not require any updates to the HydroCAD model: TE8 (Replace Buried Trunk Lines), TE10 (Initial Flush Basins to BTL), and TE13 (HD filters). Assumptions for the remaining TEs were provided in the Agency letter dated December 17, 2014 (EPA, 2014), and include TE7 (Additional Source Controls), TE9 (Low Impact Development), and TE11 (Diversion of MSD Storm Water to the Berkeley Pit) (Table 1).

Technical Element Assumptions and Incorporation Into HydroCAD

As mentioned previously, the EPA developed a list of TEs and provided the list to the group for the TI Evaluation on May 18, 2014. The assumptions for each TE are provided in Table 1 and discussed in more detail below, although only three TEs have been incorporated into the HydroCAD model (Table 2). The TE assumptions covered in this section include the following:

- TE2 – Diversion of Buffalo Gulch via Belmont Extension
- TE4 – Detention/Retention Basins
- TE6 – HD
- TE7 – Additional Source Controls
- TE8 – Replace Buried Trunk Lines
- TE9 – Low Impact Development (Bio-retention filters)
- TE10 – Capture and Treat First Flush Basins
- TE11 – Diversion of MSD Storm Water to Berkeley Pit
- TE12 – Storm Water Maintenance Program
- TE13 – HD Filters

TE2 – Diversion of Buffalo Gulch via Belmont Extension

The existing Belmont Diversion currently extends from just east of the intersection of Platinum Street and South Arizona Avenue to the Berkeley Pit, and intercepts storm water from the Upper Arizona and Upper Warren drainage basins (Figure 1).

Assumptions

It is assumed that for TE2, the diversion of Buffalo Gulch via Belmont Extension would direct storm water (up to the 25-year storm event) in the upper half of the Buffalo Gulch drainage to the Berkeley Pit. The TE2 modification would extend the existing Belmont diversion to the Buffalo Gulch trunk main as it crosses Porphyry Street between South Dakota Street and Colorado Street, just south of Emma Park. The extension would intercept storm water flows from the storm main at manhole BG-R-09 (Figure 1). For purposes of efficiency, it has been assumed that 90% of the storm flow in the upper portion of Buffalo Gulch is captured by the Belmont Extension and 10% of the storm flow would continue to Silver Bow Creek (SBC) as overland flow (and flowing to the storm sewer system located below the Belmont Extension).

Previous Efforts

Additional details on this diversion are provided in a previous TI Memo (WWC, 2010).

Incorporation into HydroCAD

To incorporate TE2 into the HydroCAD model, an additional node has been added to represent the Belmont Diversion, with the identifier “Belmont.” In the HydroCAD model provided in Attachment B, TE2 is inactive. To make this TE active, nodes “BG-R-08” and DA-BG-08 should be routed to the Belmont node. With TE2 active, the hydraulics in the HydroCAD model utilize the assumption for TE2 (Table 1) and route 90% of the runoff to the Belmont Diversion, while the remaining 10% of the runoff bypasses the inlet and continues down the basin. The Belmont node (which is otherwise identical in configuration to BG-R-09) includes a discharge multiplier of 0.10 on the outlet. By routing node BG-R-08 to the Belmont node, the HydroCAD model incorporates the removal of 90% of the runoff at Porphyry Street from the outlet of Buffalo Gulch. Attachment A includes a HydroCAD diagram for the Belmont Extension node with Buffalo Gulch routed to the node and a node report.

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The effectiveness of routing a portion of Buffalo Gulch to the Berkeley Pit via an extension of the Belmont Diversion will be evaluated in the forthcoming 2014 Storm Water TI Technical Memorandum 3: Evaluation of Technical Element Efficiency for Purposes of TI Evaluation.

Output Hydrograph

Attachment C includes an excel file for the output hydrograph for TE2 at the bottom of Buffalo Gulch before discharging to SBC. This hydrograph should be used to evaluate TE2 using @Risk.

TE4 –Detention/Retention Basins

Technical Element 4 has been modified on Table 1 as "*installation of detention/retention basins*" as per Agency comments provided on December 17, 2014. The terminology of retention basin versus detention basin refers to whether the basin retains water (i.e., retention basin) or whether the basin catches and slowly meters the water out of the basin (i.e., detention basin). Also as per the December 17, 2014, Agency comments, the "*catch basin will function hydraulically as a dry detention basin*." Therefore, the outlet orifices for the two conceptual detention basins considered under this TI evaluation have been conceptually designed using HydroCAD to provide a 24-hour centroid detention for the 10-year, 24-hour rainfall event. The outlet designs are provided in Attachment A and adhere to standard practice guidelines that typically limit the minimum diameter of any outlet orifice to 2.5 inches (New Jersey, 2004). It should be noted that the 24-hour detention requirement does not optimize the conceptual volume of the pond and does not optimize the detention time for the 5-year storm.

Assumptions

The conceptual layouts provided on Figure 2 or Figure 3 and the larger, single Buffalo Gulch detention basin and South George detention basin are only concepts used for the TI evaluation, and have not been fully evaluated for purposes of construction feasibility. The current TI evaluation is using a conservative approach in assuming a size for a detention basin for Buffalo Gulch and the MSD. Specifically, the simplifying assumption that the 10-year, 24-hour storm event for Buffalo Gulch can be detained using a single Buffalo Gulch detention basin and that the 10-year, 24-hour storm event for the MSD drainage can be detained using a single South George detention basin. Under the process of the TI evaluation, if it is determined that these larger, conceptual detention basins are not effective at significantly reducing the concentration of total recoverable COCs, then logically any smaller detention basins with similar configurations at these locations would not be effective either.

Previous Efforts

The layout of two detention basins within Buffalo Gulch has been conceptually sized under previous tasks at the McDonough and Lisac properties near the outlet of Buffalo Gulch (Figure 2). Also, during the previous TI evaluation (EPA, 2010), the conceptual South George detention basin was located to the south of George Street and west of Utah Avenue (Figure 3). This detention basin had inlet and outlet pipes from the MSD channel and included a fore bay located in the northeastern corner. It should be noted that this previous conceptual detention basin intercepted storm flows from the MSD channel at a location that was upstream of the contribution from East Buffalo Gulch.

Previous efforts have also located hydrocarbon impacts on the Lisac property. It should be noted that constructing a detention basin on the Lisac property is not considered practicable by EPA due to "organic/gasoline contamination" (Table 1).

Buffalo Gulch Detention Basin Conceptual Design

As stated previously, a conservative approach was used with the conceptual Buffalo Gulch detention basin design with the simplifying assumption that the 10-year, 24-hour storm event for Buffalo Gulch can be detained using a single Buffalo Gulch detention basin with an overall capacity of 24.8 acre-feet, which is greater than the 10-year runoff volume of 19.8 acre-feet. It should be noted that the conceptual layout provided on Figure 2 and the larger, single Buffalo Gulch detention basin are not representative of what is physically possible to construct at this location, nor does the layout represent restrictions presented by hydrocarbon contamination present on the Lisac property (Table 1).

While a conceptual design drawing has not been produced for the singular Buffalo Gulch detention basin, this single basin was created by summing elevation-area tables to create a single detention basin located east of Montana Street

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and north of the rail line. The outlets of this conceptual basin have been optimized using the 10-year, 24-hour Type I design storm event (precipitation depth of 1.8 inches with a 10-year storm runoff volume estimate of 19.8 acre-feet) to provide 24-hours of detention time between the centroids of the 10-year inflow and outflow hydrographs. It is assumed that the Buffalo Gulch sanitary storm main will be intercepted at a location just upstream of the culvert outlet at storm water monitoring station BG-01, and routed to the inlet of the Buffalo Gulch detention basin.

While the outlet of the Buffalo Gulch detention basin has been sized for the 10-year, 24-hour Type I storm, the TI evaluation will evaluate this detention basin with a 5-year, 24-hour Type I storm event with a depth of 1.6 inches. Using the design above, the 5-year, 24-hour Type I storm event has a detention time of approximately 22.1 hours.

The effectiveness of the Buffalo Gulch detention basin will be evaluated in the forthcoming 2014 Storm Water TI Technical Memorandum 3: Evaluation of Technical Element Efficiency for Purposes of TI Evaluation.

MSD (South George) Detention Basin Conceptual Design

As with the single Buffalo Gulch Detention basin, a conservative approach has been taken with the MSD (South George) detention basin by using simplifying assumptions; specifically, the assumption that all storm water reporting to the MSD channel (including contributions from East Buffalo Gulch [MSD-R-12]) could be routed into the basin and that a large enough basin could be constructed at this location. Unlike the conceptual layout provided on Figure 3, the volume of the fore bay has been incorporated into a larger detention basin, as specified during one of the Storm Water TI meetings. This larger detention basin has an overall capacity of 38.2 acre-feet, which is just under the 10-year runoff volume for the MSD drainage basin at MSD-R-12 of 38.4 acre-feet.

Even though the MSD (South George) detention basin has been sized to accommodate the majority of the 10-year, 24-hour Type I storm event, the TI evaluation will evaluate this detention basin with a 5-year, 24-hour Type I storm event with a depth of 1.6 inches. Using the design above, the 5-year, 24-hour Type I storm within the South George detention basin has a detention time of approximately 22.1 hours.

To route flows from the MSD channel to the conceptual MSD (South George) detention basin, a diversion would be required to provide enough head for conveyance (Figure 3). The conceptual diversion structure would consist of a concrete weir structure that has been modeled with two 48-inch pipes to convey the storm water to the basin. It should be noted that the conceptual layout provided on Figure 3 and the larger, single South George detention basin that intercepts storm water flow from the East Buffalo drainage basin is likely not representative of what is physically possible to construct at this location.

The effectiveness of the MSD (South George) detention basin will be evaluated in the forthcoming 2014 Storm Water TI Technical Memorandum 3: Evaluation of Technical Element Efficiency for Purposes of TI Evaluation.

Incorporation of Buffalo Gulch and MSD (George Street) Detention Basins into HydroCAD

HydroCAD was used to design the orifice outlets for both Buffalo Gulch and MSD (George Street) detention basins. These orifice outlets have been sized to provide the necessary 24-hour centroid detention for the 10-year, 24-hour rainfall event (Attachment A).

To incorporate both detention basins into HydroCAD, two new “Pond” nodes were created; the nodes appear as blue triangles on the Detention Basin diagram (Attachment A). For the Buffalo Gulch detention basin, a new node was created called “Pond BG1: BG Combined” and it represents a combined basin. To activate the Buffalo Gulch detention basin in HydroCAD, model node “BG-R-27” would be routed through “Pond BG1: BG Combined” (Detention Basin diagram, Attachment A). For the MSD (South George) detention basin, a new node was created called “Pond MSD: S George.” To activate the MSD (South George) detention basin in HydroCAD, model node “MSD-R-12” would be routed through “Pond MSD: S George” (Detention Basin diagram, Attachment A).

Also included in Attachment A are node reports for the two detention basin nodes and the results of a 5-year event for each detention basin (the report does not include any other TEs).

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Output Hydrographs

Attachment C includes an excel file for the output hydrographs for TE4 for the Buffalo Gulch and MSD detention basins. The Buffalo Gulch basin includes a hydrograph at the bottom of Buffalo Gulch (BG-01) before discharging to SBC. The MSD detention basin includes a hydrograph at the bottom of the MSD (MSD-OUT) before discharging to SBC. These hydrographs should be used to evaluate TE4 using @Risk.

TE6 – Hydrodynamic Device

Assumptions

The assumption used for TE6 (Buffalo Gulch HD) is that this device would be located near the intersection of Kaw Avenue and Front Street to reduce the concentration of total suspended solids (TSS) from storm water draining the eastern portion of the main Buffalo Gulch drainage. Flow and water quality measurements collected at manhole BG-MH-B1 are assumed to be representative of the conditions at this location for the simulation of the Buffalo Gulch HD. To simulate this HD, the 2-year, 24-hour design was used, as per the *Buffalo Gulch – Front Street Hydrodynamic Device Work Plan* (WWC, 2012) (HD Work Plan).

Previous Efforts

The HD Work Plan (WWC, 2012), which includes a design report, states that the design flow rate for the HD is the peak flow from the 2-year, 24-hour precipitation event (as required by the UAO [EPA, 2011]) of 15 cubic feet per second (cfs) while the design for the diversion structure used the 25-year, 24-hour event.

Subsequent to the HD Work Plan (WWC, 2012), a draft plan set was submitted in September 2012 using a Contech HD, model number CDS5640-10. This structure has a 10-foot inner diameter HD, with a design water quality flow rate of 9.7 cfs and a design peak flow rate of 46.7 cfs. The plan set identified the proposed HD to be located offline from the system and include a cast-in-place diversion weir with a crest of approximately 3 feet above the storm sewer invert elevation.

In 2014, the Kaw Avenue re-route project increased the diameter of the pipe located directly downstream from the proposed HD location from 18 inches to 36 inches, invalidating the design peak flow rate of 15 cfs (WWC, 2012). This change in pipe size was incorporated into Tech Memo 1 (Pioneer, 2015).

Incorporation of the Front Street HD into HydroCAD

It should be noted that the HD Work Plan (WWC, 2012) inaccurately states that the closest node to the Buffalo Gulch HD is located at the downstream end of reach BG-R-24c (represented as a grey triangle on the Detention Basin diagram in Attachment A). The location at the end of reach BG-R-24c has additional flow reporting to it, represents a higher design storm water flow, and therefore the design assumptions stated in the HD Work Plan are conservative. Also note that the Kaw Avenue re-route project increased the pipe size along reach BG-R-24c, but did not increase the pipe size along reach BG-R-23. While locating the HD node at the end of reach BG-R-24c would be conservative, the representative data collected at this location are not representative of current conditions.

The physical location of the Buffalo Gulch HD location identified in the HD Work Plan indicates a location approximately 70 feet upstream from the manhole, near the terminus of reach BG-R-23 [Attachment A]). The Buffalo Gulch HD was located within the HydroCAD model by splitting reach BG-R-23 into two reaches (BG-R-23a and BG-R-23b) with BG-R-23a routing into the HD diversion (DIV3). This HD diversion node (DIV3) was configured with a primary outlet and a secondary weir overflow. By locating the Buffalo Gulch HD along BG-R-23a, the data are more representative of current conditions and also of the physical location. The HD node (BG-HD-02) is a pond node (represented as a blue triangle on the Detention Basin diagram in Attachment A) that has been configured to have no storage.

A limitation of HydroCAD is that pipe size does not limit flow, and unreasonable head values may be produced to push larger flows into the pipe. To ensure that this condition does not occur, the quantity of flow from the upstream reach (BG-R-23a) diverted by the HD diversion node (DIV3) into the Buffalo Gulch HD (BG-HD-02) has been limited to 9.7 cfs. Any additional flow above 9.7 cfs is routed to the secondary weir overflow on the HD diversion node (DIV3) to the downstream reach (BG-R-23b). A HydroCAD diagram for the HD node with primary flow routed to the diversion node and a node report are provided in Attachment A (Summary for Pond BG-HD-02: HD).

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Output Hydrograph

The output hydrograph for TE6 at the bottom of Buffalo Gulch (BG-01), before discharging to SBC, has been provided as an excel file in Attachment C. Tab "TE6 – Front St. HD" contains the hydrographs that would flow through the HD node, bypass the HD node, and flow from the other drainages. These hydrographs do not account for the negligible lag time between Front Street and BG-01. The final output hydrograph is for the outlet at BG-01. This hydrograph should be used to evaluate TE6 using @Risk.

TE7 – Additional Source Controls

The proposed assumptions for TE7 were developed by EPA (Table 1). The provided assumptions include source control area equating to approximately 2 acres on average per sub-watershed over the entire watershed. The areas will be area weighted based on sub-watershed areas (i.e., larger sub-watersheds may have more than 2 acres and smaller sub-watersheds may have less than 2 acres). At the request of EPA, this TE has not been incorporated into the attached HydroCAD model, and any necessary modifications will be completed by CDM-Smith.

TE8 – Replace Buried Trunk Lines

The slip-lining of trunk lines in Anaconda, Texas, Warren, Locust, and Missoula Gulch drainages is proposed as TE8 (Table 1). As of January 2015, other trunk lines that have been slip-lined on the Butte Hill include the majority of the Anaconda Gulch trunk line (from Copper Street to Curtis Street), and the majority of the Buffalo Gulch trunk line (from Woolman Street to the Webster Garfield Complex on Front Street) (Pioneer, 2015).

As discussed by CDM-Smith and WET in a TI meeting, existing trunk lines in Texas, Warren, and Locust are reinforced concrete pipe (RCP), and any improvements to these lines would likely be through slip-lining. The net hydraulic change of this improvement would result in a slight reduction in pipe size and roughness coefficient, with no significant change in the routing of storm water. For purposes of Tech Memo 2, the data in Table 1 assumes that changing these parameters in the HydroCAD model would result in negligible changes to the model results. Therefore, no changes to the Texas, Warren, or Locust trunk lines have been made to the HydroCAD model.

The existing trunk line in Missoula Gulch is constructed with a combination of RCP, brick, granite, and other materials, and was determined by CDM-Smith to be the only large-scale pipe remaining that was not either RCP or already lined. During the development of assumptions for TE8 (Table 1), it was noted that runoff from Missoula Gulch reports to Catch Basins #8 and #9, which are designed to not discharge a 5-year event. For the TI evaluation, a synthetic 5-year, 24-hour storm event in Missoula Gulch would not report to Silver Bow Creek, and no appreciable reduction in storm water COCs would be realized with the slip-lining of Missoula Gulch. Because of this, no effective change has been made to the HydroCAD model for the Missoula Gulch trunk line.

TE9 – Low Impact Development

The proposed TE9 Low Impact Development (LID) assumptions were provided in the December 17, 2014, Agency comments (EPA, 2014) and include bio-retention basins (Table 1). The assumptions provided by the Agencies include placing the bio-retention basins in the same locations as the retention/detention basins (TE4). At the request of EPA, this TE has not been incorporated into the attached HydroCAD model, and any necessary modifications will be completed by CDM-Smith. Because the bio-retention basins have the potential to modify hydrographs through the capture and attenuation of runoff, it is recommended that conceptual designs should be developed to include the proper hydraulic characteristics of the structures in the HydroCAD model.

TE10 – Capture and Treat First Flush Basins

Conceptual Design

For the evaluation in the TI, the rationale behind the first flush basins is based on an evaluation performed in 2012, in which two first flush basins were sized to capture the first 5 percent (%) (approximately 0.85 acre-feet) of runoff from Buffalo Gulch and 10% (approximately 3.8 acre-feet) of runoff from MSD for the 10-year, 24-hour Type I storm event, respectively, and route the flow to the Butte Treatment Lagoons (BTL) for treatment (Table 1). These volumes were based on the previous HydroCAD model with lower CN values. Once each basin had received the first flush of any storm, the water would be routed at a combined rate of 200 gallons per minute (gpm) (100 gpm from each basin). The

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2012 HydroCAD evaluation, using rainfall data from 2007, 2008, and 2009, estimated the first flush basins would capture approximately 90 to 100 acre-feet of the total combined annual storm water volume for Buffalo Gulch and the MSD drainage basins for treatment at BTL.

Incorporation into HydroCAD
Neither the Buffalo Gulch nor the MSD first flush basins will be modeled in HydroCAD.

TI Analysis in @Risk

For the TI analysis itself, the Buffalo Gulch and MSD first flush basins would be evaluated in @Risk by removing the runoff volume of 4.83 acre-feet (0.99 acre-feet Buffalo Gulch and 3.84 acre-feet MSD) from the front of the hydrograph, with the remaining portion of the hydrograph beyond this volume continuing to SBC untreated. The volume of the first flush basin will be truncated from the existing condition HydroCAD output for @Risk incorporation and not included in the HydroCAD model.

The efficiency of the first flush basins and the feasibility of routing this storm water to the BTL will be evaluated in the forthcoming 2014 Storm Water TI Technical Memorandum 3: Evaluation of Technical Element Efficiency for Purposes of TI Evaluation.

Output Hydrograph

Attachment C includes an excel file for the output hydrographs for TE10 at the bottom of Buffalo Gulch (BG-01) and MSD (MSD-R-12) before discharging to SBC. These hydrographs should be used to evaluate TE10 using @Risk.

TE11 – MSD to Berkeley Pit

The proposed assumptions for TE11 were provided by EPA (Table 1) and state the location of the diversion will be the key factor, but no analyses were provided to investigate the location of the diversion. Because TE11 has the capability to significantly alter the MSD hydrograph reporting to SBC, it is suggested that a conceptual design should be developed to include the diversion location in the HydroCAD model. At the request of EPA, this TE has not been incorporated into the attached HydroCAD model, and any necessary modifications in HydroCAD and/or @Risk will be completed by CDM-Smith.

TE12 – Storm Water Maintenance Program

The proposed assumptions for TE12 were provided by EPA. The provided assumptions only discuss potential assumptions for efficiency on a maintenance program. It is assumed the TE would not impact the hydrology of the sub-watersheds, and therefore has not been included in the model as a change.

TE13 – HD Filters

Assumptions

Technical Element 13, HD filters consists of the conceptual installation of filter systems located downstream from the HDs. The purpose of these filter systems would be to treat total recoverable metals after the coarser sediment is (presumably) removed by the HD.

The typical filter system consists of a vault, multiple filters situated in parallel, inlet and outlet pipes, and a high flow bypass. The Tech Memo and Table 1 assumptions are based on a filter bank system manufactured under the name StormFilter and produced by Contech. This filter system is typically configured to be a passive siphon-activated flow-through filtration system. For each filter cartridge, the manufacturer's specifications (which have not been field-verified) state a treatment rate of between 2 to 15 gpm, depending on the COCs to be treated, with a typical treatment filter cartridge flow rate of 7.5 gpm. The filter cartridges use rechargeable active treatment such as ion exchange technology or other media to remove COCs. A HD filter system is comprised of one or more vaults that house multiple filter cartridges. The system is sized for the required number of filter cartridges to meet the peak design flow rate.

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Conceptual Design

Typically, the system is sized to treat the peak flow of a chosen water quality design storm. Due to the number of filters required, it is impractical to treat the chosen TI design event of the 5-year, 24-hour storm event. As outlined in the October 28, 2014, TI presentation on assumptions for TE 10 and TE13, it has been assumed that the filter systems would treat 90 to 100 acre-feet (similar to the first flush basins [TE10]). The design flows for each filter system were based on a typical 8-foot by 24-foot vault capable of treating 400 gpm (7.5 gpm per filter cartridge at 1 gpm per square foot).

To size each conceptual filter system, it was assumed that each system is located downstream of an existing HD or a conceptual HD (TE13), and have been designed using the Irrigation Water Requirements (IWR) database. This database includes average precipitation for the period of 1970 to 2000 and the average rainfall for each month equates to the yearly average rainfall of about 12.9 inches. Because this yearly average rainfall is close to the 2009 rainfall record (approximately 13.0 inches), data from 2009 were used within HydroCAD to estimate the resulting runoff at each filter location for an average year. To treat 90 to 100 acre-feet with the six conceptual filter system locations, the capacity of each filter system was optimized to the nearest 400 gpm (Table 3), for a combined maximum flow treatment rate of 2,800 gpm (Table 1).

Incorporation into HydroCAD

Technical Element 13 – HD Filters has not been included in the model. The design flow will be truncated from the existing condition hydrograph for each of the proposed filter locations and have an efficiency applied. Flows above the filter capacity will continue downstream without being treated by the filter.

The effectiveness of the HD filters will be evaluated in the forthcoming 2014 Storm Water TI Technical Memorandum 3: Evaluation of Technical Element Efficiency for Purposes of TI Evaluation.

Output Hydrograph

Attachment C includes an excel file for the output hydrographs for TE13 at Anaconda Road (AR-OUT), Warren Avenue (WA-SD), and Texas (MSD-SS-R-07) before discharging to MSD. The two filters proposed for the Buffalo Gulch drainage are summed with the other drainage areas neglecting the negligible lag time between Front Street and BG-01. The final output hydrograph is for the outlet at BG-01. These hydrographs should be used to evaluate TE13 using @Risk.

Conclusions

The Existing Condition 9-2014 HydroCAD model was used to develop the Technical Element HydroCAD model (Technical Elements 2014) (Attachment B), which includes three applicable TEs, as follows:

- TE2 – Diversion of Buffalo Gulch via Belmont
- TE4 – Detention Basins (Buffalo Gulch & South George)
- TE6 – Buffalo Gulch at Front Street Hydrodynamic Device

The model is setup to be run for the 5-year, 24-hour storm event and provide hydrology output for the @Risk simulations. The tabular hydrograph output can be incorporated in the @Risk model. The TEs require routing or un-routing depending on which TE is desired for input to @Risk. The time step and duration of the model should be modified to match the chosen values for the @Risk simulations.

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References

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Tables

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Table 1: Final Revised Storm Water TI Assumption and Efficiency Matrix

Existing Technology Elements (TE)

Technology Element (TE)	Modified Description (Updated 1/20/2015)	Comments (EPA, May 28, 2014)	Revised Assumptions for Incorporating Each Technical Element into HydroCAD (Updated with Agency Comments from 12/17/2014)
TE 1	Diversion of Buffalo Gulch to Underground Workings	**NOT BEING CONSIDERED FOR THE 2014 TI**	
TE 2	Diversion of Buffalo Gulch storm water (above Porphyry Street) to the Berkeley Pit via the Belmont diversion	Reconsider this TE in the 2014 TI evaluation. Was not modeled in 2010	**(1) Assumptions** ● Assume 90% capture of 10-year/24-hour storm and 5-year/24-hour storm (Reduction to account for overland flow). **(2) Approach** ● Route BG at Porphyry to pit within HydroCAD model ● Remaining 10% continues to SBC using a flow multiplier
TE 3	Diversion of West Side Drain Base Flow to the Underground	**NOT BEING CONSIDERED FOR THE 2014 TI**	
TE 4	Installation of detention/retention basins	In 2010, only 2 out of the 9 catch basins were considered. The 2014 TI will consider 7 of the 9 catch basins proposed in 2010 TI Appendix D-3. The space for the MSD-Locust catch basin has already been in use for the Texas Avenue HDD and is no longer available, and therefore is not considered practicable. A catch basin on the Lisac property is not considered practicable due to organic/gasoline contamination which is unlikely to be remediated in the near or mid-term time frame. Additionally, the area for the South George catch basin will be expanded to cover the undeveloped lands.	**(1) Assumptions** ● MSD detention basin intercepts water from MSD channel downstream of East Buffalo Gulch and will be related to MSD-3A. ● BG detention basin located at base of drainage and will be related to BG-01. **(2) Approach** ● HydroCAD modified to include two detention basins sized to detain 10-year/24-hour runoff for 24 hours, as follows: ● BG: 17.1 acre-feet ● MSD: 37.7 acre-feet
TE 5	Installation of sediment traps in MSD	**NOT BEING CONSIDERED FOR THE 2014 TI**	
TE 6	Installation of hydrodynamic devices (HDD's)	Possibly install HDD Devices on East Buffalo/Front Street	**(1) Assumptions** ● One HD added to model at Kaw and Front Street ● 2year/24-hour design HD (WWC, September 2012) ● Flow and water quality to be related to BG-MH-B1 **(2) Approach** ● 2-year/24-hour HD design inserted into HydroCAD model ● Diversion weir simulated to divert flow into the HD with no storage ● Overflow continues to SBC without treatment.
TE 7	Additional Source Controls	This TE will be reconsidered using a general approach. Two "source control" sites will be applied to each of the subareas and no specific locations will be identified. May include a combination of sites and actions to prevent or mitigate storm water runoff from interacting with surface source areas.	**Assumptions to be provided by EPA and CDM**
TE 8	Replace buried trunk lines	This TE would be modified to include slip lining of the trunk lines in Texas, Warren, Locust, and Missoula Gulch.	**(1) Assumptions** ● Not incorporating any changes; assumes negligible changes to model results. **(2) Approach**

Table 1: Final Revised Storm Water TI Assumption and Efficiency Matrix

New Technology Elements (TE)

Technology Element(TE)	Description	Comments	Revised Assumptions for Incorporating Each Technical Element into HydroCAD (Updated with Agency Comments from 12/17/2014)
TE 9	Low Impact Development	Bio-retention filters in Buffalo Gulch catch basin and WL-12 catch basin.	**Assumptions to be provided by EPA and CDM**
TE 10	Capture and Treat First Flush	Route storm water (may require pumping) from Buffalo Gulch and MSD catch basins to HCC or the Berkeley Pit. Includes reducing pumping rates of West Camp to provide additional capacity to BTL.	**(1) Assumptions** ● MSD detention basin located at Kaw Avenue and will be related to MSD-3A. ● BG detention basin located at base of drainage and will be related to BG-01. **(2) Approach** ● First flush basins sized to capture: ● 5% of 10-year storm for BG (0.85 acre-feet) ● 10% of 10-year storm for MSD (3.8 acre-feet)
TE 11	MSD to Berkeley Pit	Capture storm water in MSD corridor and route to Berkeley Pit.	**EPA/CDM to define any necessary HydroCAD modeling. Awaiting a list from CDM**
TE 12	Storm water maintenance program	Existing program to include entire BPSOU storm water system.	**EPA/CDM Indicates no changes to HydroCAD**
TE 13	HDD Filters	This TE will include installation of "filters" at the downstream end of the HDD's	**(1) Assumptions** ● Sized to treat 25% of the annual average storm water runoff volume. ● Banks of filters set up downstream of HDs ● Vaults contain multiple filters ● Each filter treats approximately 7.5 gpm ● BG Garfield treats 800 gpm ● Texas Avenue treats 800 gpm ● Anaconda Road HD treats 400 gpm ● Warren Avenue HD treats 400 gpm ● Potential Front Street HD (TE4) treats ~400 gpm ● **Total treated rate: 2,800 gpm** **(2) Approach** ● No changes to the HydroCAD model ● Performed in @Risk
TE 14	TBD	Various combinations of a variety of BMP's. Will not be the same as 2010 combinations due to changes in infrastructure and other issues.	
TE 15	TBD	Various combinations of a variety of BMP's. Will not be the same as 2010 combinations due to changes in infrastructure and other issues.	

Notes:

Technical elements 1 through 8 were included in the 2010 TI report

Technical elements 9 through 15 are added

TBD = To be determined

The transfer of contaminated water from storm water of snowmelt events for treatment through an existing treatment system is limited to 25% combined average annual storm water flow for BPSOU storm water drainages

TABLE 2 - TECHNICAL ELEMENTS MODEL UPDATES

Project	Description	Model Modification Summary
Buffalo Gulch Diversion via Belmont Extension	Divert the upper portion of Buffalo Gulch at Porphyry Street via an extension of the existing Belmont Diversion to the Berkeley Pit	Belmont diversion captures 90% of upstream flows. Reroute flows at node BG-R-09 to the Belmont node. This node has Discharge Multiplier = 0.10 so only 10% continues down drainage.
Combined BG Detention Basin	Conceptual combined detention basin north of the rail line to treat water discharging to SBC from Buffalo Gulch south of Holland Street and east of Montana Street.`	Physical characteristics of detention basin based on combined surface areas of the Lisac and McDonough conceptual plans developed in August, 2012. Node BG-R-27 routed through combined basin. Outlet structure sized to proved 24-hour centroid detention for the 10-year 24-hour rainfall event.
MSD-South George Detention Basin	Detention basin south of the MSD and George Street and west of Utah Avenue.	Node MSD-R-12 routed through the conceptual basin. Outlet structure sized to proved 24-hour centroid detention for the 10-year 24-hour rainfall event.
Buffalo Gulch at Front Street Hydrodynamic Device	Hydrodynamic device along Front Street upstream of Kaw Avenue	Proposed hydrodynamic device inserted in model near end of node BG-R-23. HD designed for 2-eyar 24-hour event. Flows larger than the capacity are diverted downstream and not treated by HD.

TABLE 3 - HD FILTERS FLOW ANALYSIS

HD #	HDs	Design Flow (gpm)	Design Flow (cfs)
1	BG Garfield	800	1.78
2	AR	400	0.89
3	WA	400	0.89
4	TX	800	1.78
5	MT ST	0	0
6	BG Front (proposed)	350	0.78

	Summary		HD 1 Vol		HD 2 Vol		HD 3 Vol		HD 4 Vol		HD 6 Vol
	Filter Total	**96.1** ac-ft	34.2		13.9		10.1		26.5		11.3
	IFB Total	**98.0** ac-ft									
	Annual Total	384 ac-ft	25% of Total =	96.1 ac-ft							
Date	Total Volume (cf)		HD 1 Vol (cf)		HD 2 Vol (cf)		HD 3 Vol (cf)		HD 4 Vol (cf)		HD 6 Vol (cf)
Total Sum	**16744698**		**1491567**		**606959**		**439240**		**1153851**		**493350**

Figures

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LEGEND

EXISTING BELMONT DIVERSION

BELMONT DIVERSION EXTENSION

NOTE: THIS CONCEPTUAL DESIGN HAS BEEN PROVIDED FOR PURPOSES OF EVALUATING THE TECHNICAL IMPRACTICABILITY OF STORM WATER IN BPSOU ONLY AND IS NOT NECESSARILY REFLECTIVE OF WHAT IS PHYSICALLY POSSIBLE AT THIS LOCATION.

N

DISPLAYED AS:

COORD SYS/ZONE: MSP

DATUM: NAD 83, NAVD88

UNITS: INT. FEET

SOURCE: PIONEER

SCALE IN FEET

0 50 100

FIGURE 1

PIONEER TECHNICAL SERVICES, INC.

BUTTE, MT 59701

63 1/2 WEST BROADWAY

(406) 782-5177

ATLANTIC RICHFIELD
TECHNICAL ELEMENTS
BELMONT DIVERSION
TO BERKELEY PIT

DATE: 12-18-2014

12/18/2014 8:26:35 AM P:\ARCO\BPSOU\REMEDY-RESTORATION\CAD\RR-DE-PLN-001-12 OVERVIEW.DWG

LEGEND

EXISTING UTILITIES

SLW	SILVER LAKE WATER LINE	WTR	WATERLINE
EFF	TREATMENT PLANT EFFLUENT	PWR	UNDERGROUND POWER
MSD	METRO STORM DRAIN	TEL	UNDERGROUND TELEPHONE
SS	SANITARY SEWER	GAS	UNDERGROUND GAS
OHP	OVERHEAD POWER	OE	OVERHEAD ELECTRIC

NOTE: THIS CONCEPTUAL DESIGN HAS BEEN PROVIDED FOR PURPOSES OF EVALUATING THE TECHNICAL IMPRACTICABILITY OF STORM WATER IN BPSOU ONLY AND IS NOT NECESSARILY REFLECTIVE OF WHAT IS PHYSICALLY POSSIBLE AT THIS LOCATION.

N

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD 83, NAVD88
UNITS: INT. FEET
SOURCE: PIONEER

SCALE IN FEET
0 50 100

FIGURE 2

PIONEER TECHNICAL SERVICES, INC.
BUTTE, MT 59701
63 1/2 WEST BROADWAY
(406) 782-5177

ATLANTIC RICHFIELD
BUFFALO GULCH BMP'S
DETENTION BASINS

DATE: 12-18-2014

12/18/2014 8:54:15 AM P:\ARCO\BPSOU\REMEDY-RESTORATION\CAD\RR-FIG-PLN-001-14.DWG

LEGEND

EXISTING UTILITIES

SLW	SILVER LAKE WATER LINE	WTR	WATERLINE
EFF	TREATMENT PLANT EFFLUENT	PWR	UNDERGROUND POWER
MSD	METRO STORM DRAIN	TEL	UNDERGROUND TELEPHONE
SS	SANITARY SEWER	GAS	UNDERGROUND GAS
OHP	OVERHEAD POWER	OE	OVERHEAD ELECTRIC

NOTE: THIS CONCEPTUAL DESIGN HAS BEEN PROVIDED FOR PURPOSES OF EVALUATING THE TECHNICAL IMPRACTICABILITY OF STORM WATER IN BPSOU ONLY AND IS NOT NECESSARILY REFLECTIVE OF WHAT IS PHYSICALLY POSSIBLE AT THIS LOCATION.

N

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD 83, NGVD29
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 100 200

FIGURE 3

PIONEER TECHNICAL SERVICES, INC.
BUTTE, MT 59701
63 1/2 WEST BROADWAY
(406) 782-5177

ATLANTIC RICHFIELD
BUFFALO GULCH BMP'S
SOUTH GEORGE
DETENTION BASIN

DATE: 12-18-2014

12/18/2014 9:18:36 AM P:\ARCO\BPSOU\REMEDY-RESTORATION\CAD\RR-FIG-PLN-001-14.DWG

Attachment A
Node Reports

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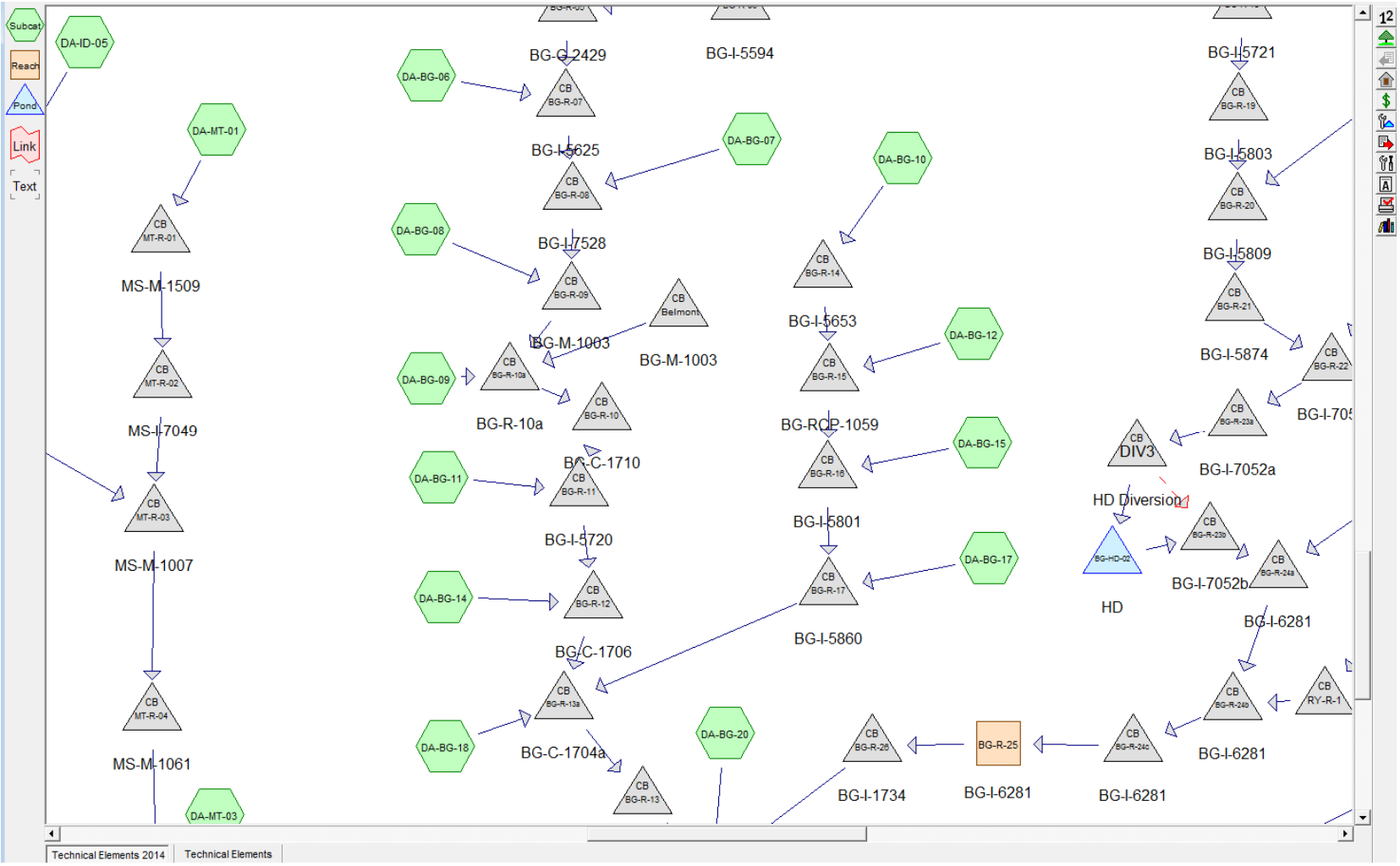
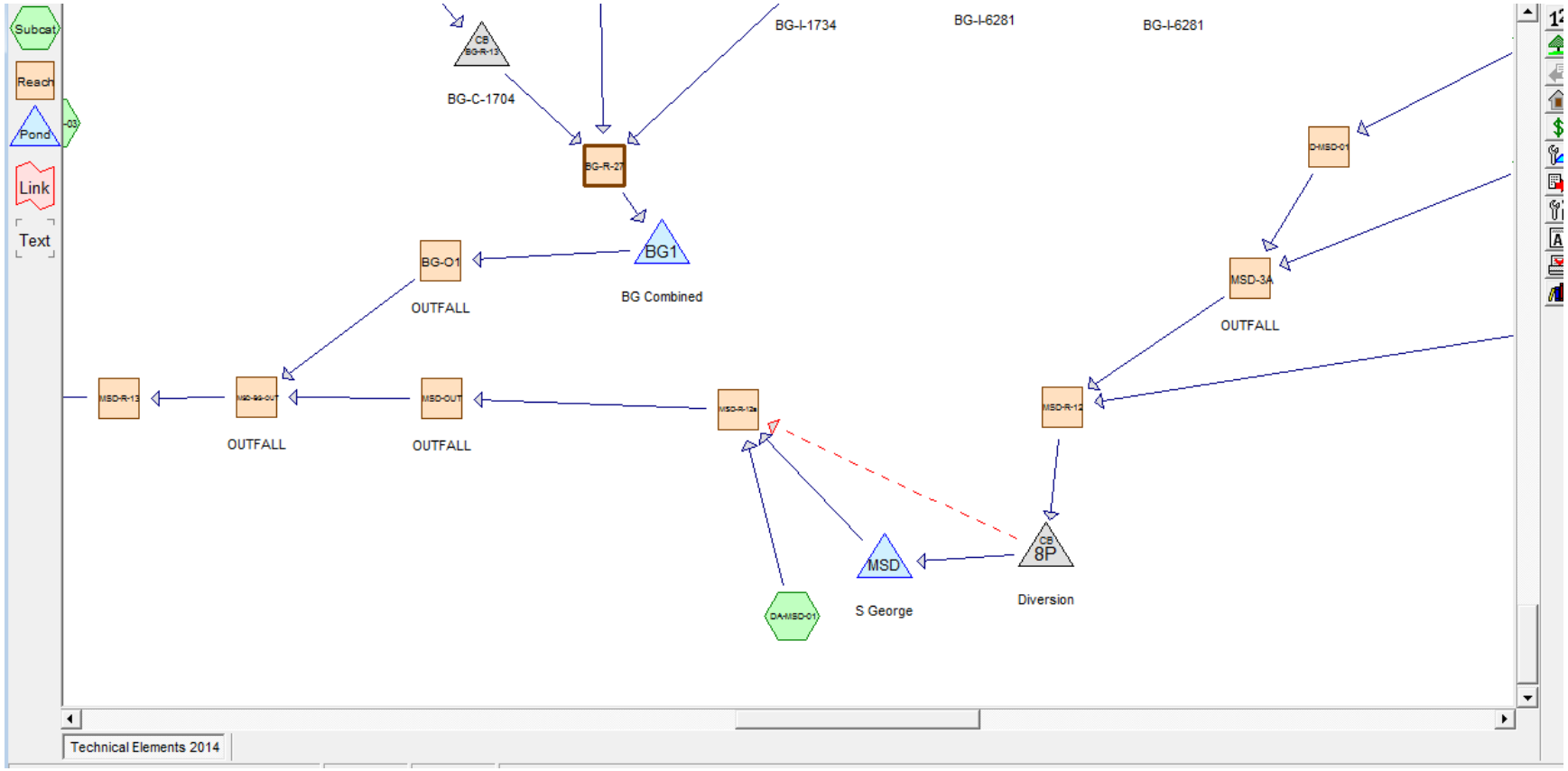
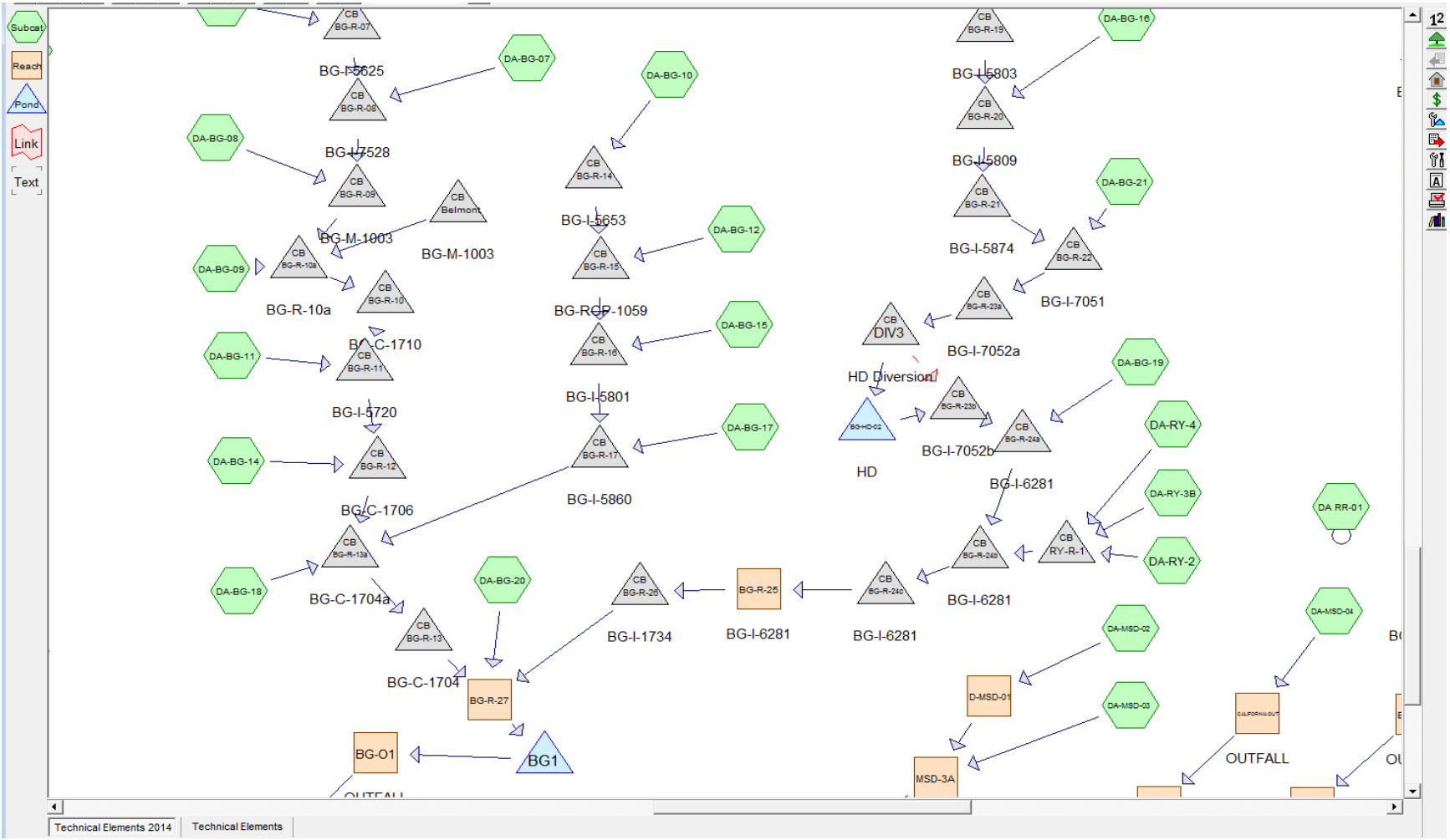
TE2 – Belmont Diversion Diagram



TE4 – Detention Basins Diagram



TE6 – Front St. HD Diagram



Summary for Pond Belmont: BG-M-1003

[57] Hint: Peaked at 5,795.10' (Flood elevation advised)
[80] Warning: Exceeded Pond BG-R-08 by 78.05' @ 9.90 hrs (238.54 cfs 2.584 af)

Inflow Area =	88.600 ac,	0.00% Impervious,	Inflow Depth =	0.74"	for 5-Year event
Inflow =	45.40 cfs @	9.96 hrs,	Volume=	5.430 af	
Outflow =	45.40 cfs @	9.96 hrs,	Volume=	5.430 af,	Atten= 0%, Lag= 0.0 min
Primary =	45.40 cfs @	9.96 hrs,	Volume=	5.430 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.10 hrs
Peak Elev= 5,795.10' @ 9.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	5,659.51'	**42.0" Round Culvert X 0.10** L= 901.0' Ke= 1.000 Inlet / Outlet Invert= 5,659.51' / 5,605.03' S= 0.0605 '/' Cc= 1.000 n= 0.010 PVC, smooth interior, Flow Area= 9.62 sf

Primary OutFlow Max=42.44 cfs @ 9.96 hrs HW=5,782.14' TW=5,609.33' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 42.44 cfs @ 4.41 fps)

Summary for Pond BG1: BG Combined

[63] Warning: Exceeded Reach BG-R-27 INLET depth by 1.11' @ 24.60 hrs

Inflow Area = 308.270 ac, 0.00% Impervious, Inflow Depth = 0.63" for 5-Year event
Inflow = 124.65 cfs @ 10.00 hrs, Volume= 16.082 af
Outflow = 4.04 cfs @ 24.05 hrs, Volume= 14.618 af, Atten= 97%, Lag= 843.5 min
Primary = 4.04 cfs @ 24.05 hrs, Volume= 14.618 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.10 hrs
Starting Elev= 5,441.50' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 5,445.18' @ 24.05 hrs Surf.Area= 188,211 sf Storage= 520,009 cf

Plug-Flow detention time= 1,524.9 min calculated for 14.618 af (91% of inflow)
Center-of-Mass det. time= 1,473.3 min (2,309.2 - 836.0)

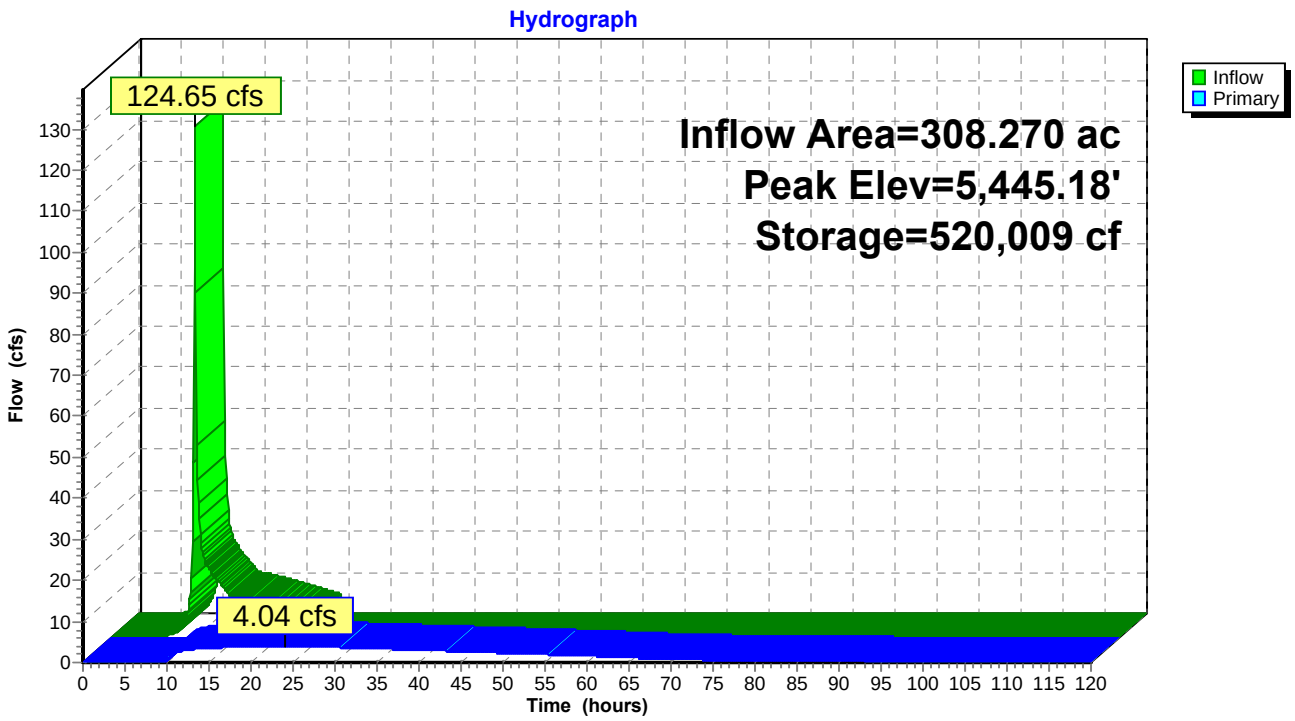
Volume	Invert	Avail.Storage	Storage Description
#1	5,442.00'	1,513,462 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,442.00	86,177	0	0
5,443.00	170,312	128,245	128,245
5,444.00	179,686	174,999	303,244
5,445.00	186,906	183,296	486,540
5,446.00	194,220	190,563	677,103
5,447.00	201,599	197,910	875,012
5,448.00	209,028	205,314	1,080,326
5,449.00	216,472	212,750	1,293,076
5,450.00	224,300	220,386	1,513,462

Device	Routing	Invert	Outlet Devices
#1	Primary	5,441.00'	**24.0" Round Culvert** L= 64.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 5,441.00' / 5,440.00' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	5,442.50'	**12.0" W x 6.5" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=4.04 cfs @ 24.05 hrs HW=5,445.18' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 4.04 cfs of 23.79 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 4.04 cfs @ 7.47 fps)

Pond BG1: BG Combined



Summary for Pond MSD: S George

[80] Warning: Exceeded Pond 8P by 0.38' @ 37.50 hrs (0.67 cfs 0.057 af)

Inflow Area =	892.100 ac,	0.00% Impervious,	Inflow Depth =	0.40"	for 5-Year event
Inflow =	70.12 cfs @	10.72 hrs,	Volume=	29.734 af	
Outflow =	7.57 cfs @	24.91 hrs,	Volume=	28.606 af,	Atten= 89%, Lag= 851.3 min
Primary =	7.57 cfs @	24.91 hrs,	Volume=	28.606 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.10 hrs
Peak Elev= 5,452.15' @ 24.91 hrs Surf.Area= 376,453 sf Storage= 948,328 cf

Plug-Flow detention time= 1,578.0 min calculated for 28.606 af (96% of inflow)
Center-of-Mass det. time= 1,554.5 min (2,500.4 - 945.9)

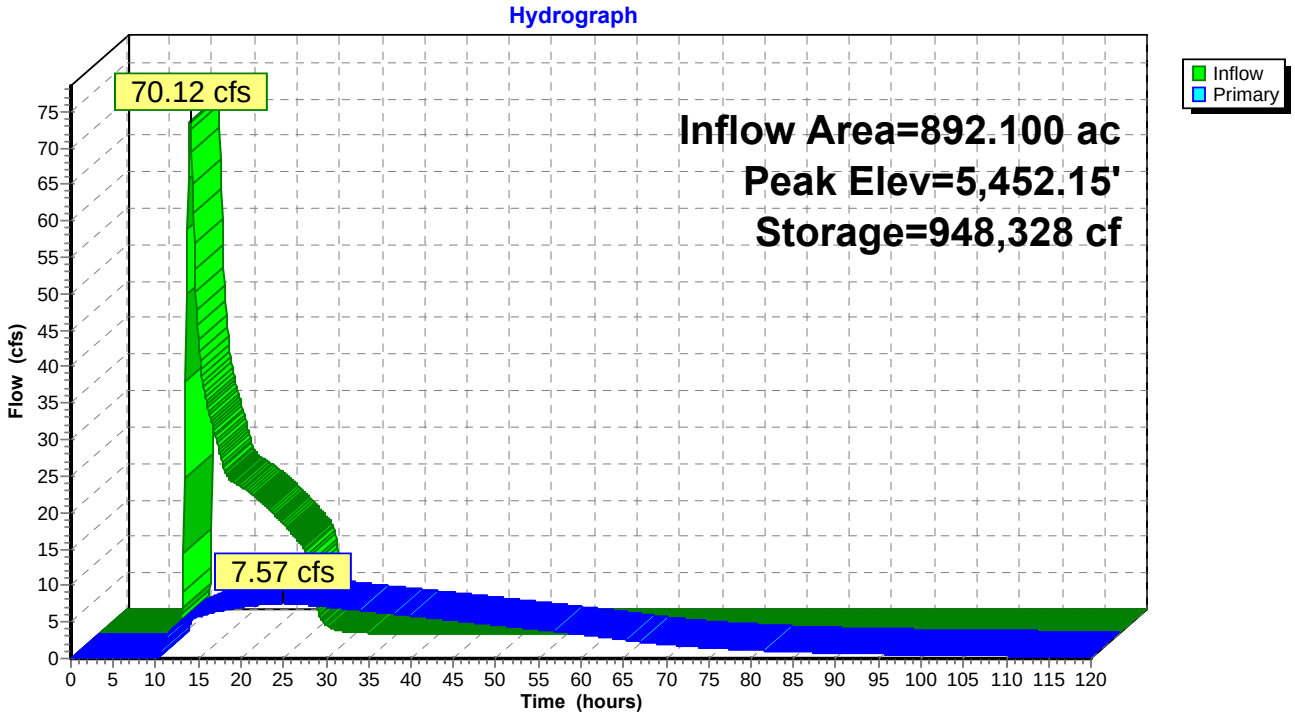
Volume	Invert	Avail.Storage	Storage Description
#1	5,449.50'	2,066,279 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,449.50	335,000	0	0
5,450.00	350,000	171,250	171,250
5,451.00	360,000	355,000	526,250
5,452.00	375,000	367,500	893,750
5,453.00	385,000	380,000	1,273,750
5,454.00	395,000	390,000	1,663,750
5,455.00	410,057	402,529	2,066,279

Device	Routing	Invert	Outlet Devices
#1	Primary	5,448.00'	**24.0" Round Culvert** L= 405.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5,448.00' / 5,444.00' S= 0.0099 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	5,449.50'	**18.0" W x 8.3" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=7.57 cfs @ 24.91 hrs HW=5,452.15' TW=5,443.16' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.57 cfs of 21.18 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 7.57 cfs @ 7.29 fps)

Pond MSD: S George



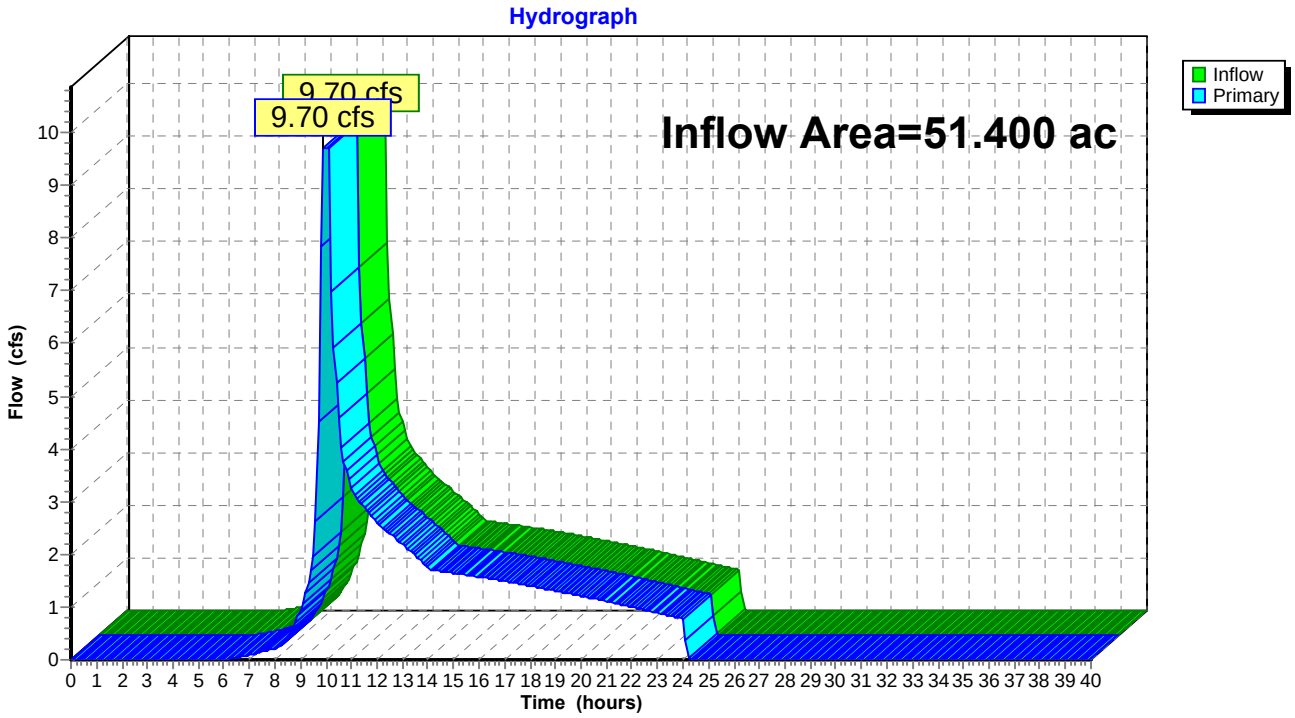
Summary for Pond BG-HD-02: HD

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	51.400 ac,	0.00% Impervious,	Inflow Depth =	0.58"	for 5-Year event
Inflow =	9.70 cfs @	9.90 hrs,	Volume=	2.478 af	
Primary =	9.70 cfs @	9.90 hrs,	Volume=	2.478 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.10 hrs

Pond BG-HD-02: HD



Attachment B
HydroCAD Model

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Attachment C
Hydrograph File

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APPENDIX D3

Technical Memorandum 3:
Butte Priority Soils Operable Unit Technology Elements Efficiency Evaluation

Atlantic Richfield Company
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March 6, 2015

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RE: Technical Memorandum 3: Butte Priority Soils Operable Unit (BPSOU) Technology Elements Efficiency Evaluation

Ladies and Gentlemen:

Atlantic Richfield Company is submitting *Technical Memo 3: Butte Priority Soils Operable Unit (BPSOU) Technology Elements Efficiency Evaluation* for your review, approval, and use in the surface water technical impracticability evaluation effectiveness modeling. We are providing the initial version of this memorandum on the electronic file transfer protocol (ftp) site "ShareFile." In addition, hard copies of the memorandum with electronic appendices on a CD will be provided to the EPA and DEQ.

If you have questions or concerns, please do not hesitate to call me at (406) 723-1826.

Sincerely,

Loren Burmeister
Operations Project Manager

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Technical Memorandum 3: Butte Priority Soils Operable Unit (BPSOU) Technology Elements Efficiency Evaluation

Atlantic Richfield Company

March 6, 2015

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft Final

Technical Memorandum 3: Butte Priority Soils Operable Unit (BPSOU) Technology Elements Efficiency Evaluation

Prepared for:

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March 6, 2015

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REVISION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	C. Bailey J. Bryson	Draft	Issued for Internal Atlantic Richfield Company Review	March 4, 2015
Rev 1	C. Bailey J. Bryson	Draft Final	Issued for Agency Review	March 6, 2015

1.0 INTRODUCTION

This *Draft Final Technical Memorandum 3: Butte Priority Soils Operable Unit (BPSOU) Technology Elements Efficiency Evaluation* (Tech Memo 3) is being provided to support the 2014/2015 BPSOU Technical Impracticability (TI) process. Tech Memo 3 evaluates the efficiencies of specific Technology Elements (TEs) (Table 1) to reduce constituents of concern (COCs) from storm water prior to discharge to Silver Bow Creek. The purpose of this Tech Memo 3 is specifically to provide a range of efficiencies for the following TEs (Table 1):

- TE2: Diversion of Buffalo Gulch Storm Water (above Porphyry Street) to the Berkeley Pit via the Belmont Diversion.
- TE4: Installation of Detention/Retention Basins.
- TE6: Installation of Hydrodynamic Devices (HDs).
- TE6: Capture and Treat First Flush Retention Basins.
- TE13: HD Filters.

The efficiencies developed in Tech Memo 3 are based on the efficiency assumptions provided in Table 1, Final Revised Storm Water TI Efficiency Matrix. Table 1 was jointly developed by the Agencies and Atlantic Richfield Company (Atlantic Richfield) to identify the assumptions, methodologies, and data sets that would be used in this memo to develop COC removal efficiency ranges for the TEs listed above. Table 1 was last updated during the February 24, 2015, BPSOU Storm Water TI meeting between the Environmental Protection Agency (EPA), Montana Department of Environmental Quality (DEQ), Butte-Silver Bow (BSB), and Atlantic Richfield.

1.1 Background

The Silver Bow Creek/Butte Area National Priorities List (NPL) Site, which includes the BPSOU, represents one of four contiguous Superfund sites in the upper Clark Fork River basin. The site encompasses approximately 85 square miles including the entire length of Silver Bow Creek and adjacent land from Butte westward approximately 25 miles to the Warm Springs Ponds near Anaconda. The site incorporates several square miles of land area within and near Butte, Montana. The BPSOU lies within the Butte portion of the Silver Bow Creek/Butte Area site. The BPSOU boundary, storm water drainages, and other general features are shown on Figure 1.

1.2 Overview of the Current Technical Impracticability Process

The EPA and the Montana DEQ are performing a TI evaluation to determine whether remedial actions to reduce metals concentrations in surface water below State of Montana standards are technically impracticable. Assessing the potential effectiveness of select TEs in lowering COC concentrations in Silver Bow Creek is needed to support the TI evaluation and has been evaluated using existing storm water data, hydrographs generated from the Pioneer Technical Services, Inc. (Pioneer) *Revised Technical Memo 1: Updated BPSOU Existing Conditions HydroCAD Model* (Pioneer, 2015a), assumptions on TE efficiencies, and a stochastic model.

1.2.1 Related Submittals

As part of the TI process, the following have been provided to the Agencies for review.

- *Revised Technical Memo 1: Updated BPSOU Existing Conditions HydroCAD Model* (Pioneer, 2015a) was provided to the Agencies by Atlantic Richfield on January 15, 2015 (Tech Memo 1). The updated HydroCAD model is based on current National Resources Conservation Service (NRCS) hydrologic soil groups (HSGs) (NRCS, 2013) and Curve Numbers (CNs) provided by CDM-Smith, and replaced the version provided to the Agencies on October 6, 2014. In general, the updated HSGs increase CN values in some areas, which in turn cause runoff to occur more rapidly.
- *Storm Water TI Revised Assumptions and Efficiency Matrix* (Pioneer, 2015b) (Assumptions and Efficiency Matrix) was provided to the Agencies via e-mail correspondence on January 21, 2015. This table replaces the October 6, 2014, *Assumptions Table for Technical Elements Modeling* provided to the Agencies via e-mail correspondence from Loren Burmeister. The January 21 version has been updated with comments received from EPA and DEQ during the October 14 and October 28, 2014; TI meetings; written comments provided on December 17, 2014, and December 18, 2014; and additional comment received via email on February 18, 2015.
- On February 10, 2015, the 2014 *Updated BPSOU Existing Conditions HydroCAD Model* (Pioneer, 2015a) was updated with select TEs and provided to the EPA, Montana DEQ, and the City-County of Butte-Silver Bow (BSB) via e-mail correspondence as *Technical Memorandum 2: BPSOU Technical Elements and HydroCAD Modeling Assumptions* (Pioneer, 2015c) (Tech Memo 2). Tech Memo 2 provides assumptions and HydroCAD model updates for TE2 (Diversion of Buffalo Gulch via the Belmont Extension), TE4 (Detention/Retention Basins), and TE6 (Installation of HDs) (Table 1). Tech Memo 2 also provides assumptions for TE8 (Replace buried trunk lines), TE10 (Capture and Treat First Flush Retention Basins), and TE13 (HD Filters), but these TEs did not require any updates to the HydroCAD model.

1.2.2 Stochastic Modeling

The goal of using a stochastic model is to predict how frequently a range of possible outcomes might occur. A stochastic model uses existing information and probability distribution functions (PDFs) of model inputs randomly assigned over time steps (e.g., input storm water concentrations and TE effectiveness) to estimate the PDF of a modelled output, such as the concentrations of metals in Silver Bow Creek at a compliance point over a specific (modelled) runoff event (i.e., the probability of select TEs lowering COC concentrations in Silver Bow Creek). The stochastic software model that will be used is the Microsoft Excel-based @Risk software, which uses a Monte Carlo simulation to run a given model for a large number of iterations while randomly sampling input probability distributions for each stochastic parameter. The model is a spreadsheet mixing model that uses inputs for flow and chemistry concentration for the Butte Hill and Metro Storm Drain (MSD) drainage basins, Blacktail Creek, and other outfalls. The PDFs of contaminant loads from the different outfalls are sequentially mixed together to estimate downstream loads in Silver Bow Creek. The model assumes that metals are not degraded, settled, or resuspended and that instantaneous and complete mixing occurs at each

outfall. Using the stochastic model in coordination with the HydroCAD hydrology model, different TEs are probabilistically evaluated for the potential of meeting downstream water quality criteria.

1.2.3 Modeling of Technology Elements

Each proposed TE is evaluated using the model for probability of downstream water quality compliance. The first step of the current TI process was to revise the HydroCAD model (Pioneer, 2015c) where necessary to incorporate the range of hydrologic effects of each Best Management Practice (BMP) on the runoff. Apart from the change in hydrology, the potential effects of the proposed TE on the water quality of Silver Bow Creek is represented by application of TE performance efficiencies to calculate reduction of chemistry inputs versus revised output loads. @Risk uses a simple multiplier to reduce the concentration resulting in a reduction of the load. For example, if @Risk multiplies the concentration by a factor of 0.6, the result is a decrease in the concentration of 40 percent. The following sections discuss the efficiency evaluations for each of the applicable TEs.

2.0 TECHNOLOGY ELEMENT EFFICIENCIES

The method for estimating the effectiveness for each TE varies depending on the conceptual TE configuration. Some TEs remove flow from particular drainages and reroute it to treatment (TE2 and TE10) where other TEs intercept all or a portion of the runoff stream and treat it in place either actively or passively (TE4, TE6, and TE13). Table 1 displays the basic assumptions for the TE effectiveness evaluations. The remaining sections of this report will evaluate each TE individually for effectiveness in detail and propose an applicable efficiency or range of efficiencies to be incorporated in the @Risk evaluations.

The TE efficiencies covered in this report include:

- TE2: Diversion of Buffalo Gulch Storm Water (above Porphyry Street) to the Berkeley Pit via the Belmont Diversion
- TE4: Installation of Detention/Retention Basins
- TE6: Installation of HDs
- TE6: Capture and Treat First Flush Retention Basins
- TE13: HD Filters

2.1 TE2 Efficiency – Diversion of Buffalo Gulch via Belmont Extension

The existing Belmont Diversion currently extends from just east of the intersection of Platinum Street and South Arizona Avenue to the Berkeley Pit, and intercepts storm water from the Upper Arizona and Upper Warren drainage basins (Figure 1). The TE2 (Diversion of Buffalo Gulch via Belmont Extension) assumes the existing Belmont diversion is extended up to the Buffalo Gulch (BG) trunk main as it crosses Porphyry Street (Pioneer, 2015c). Assumptions for hydrologic modelling (Table 1 and Tech Memo 2 [Pioneer, 2015c]) assumed that 90% of the flow upstream from Porphyry Street would be collected within the diversion and the remaining 10% would flow overland and continue downstream. Flows captured by the diversion and routed to the pit would

receive treatment with an assumed efficiency of 100%, while flow that bypasses the diversion would not be treated and therefore had an efficiency of 0%. @Risk uses the resulting hydrograph to calculate the uncaptured potential loads entering Silver Bow Creek at the BG outfall 01 (BG-01). The load reduction by TE2 is not reduced by COC removal efficiency but rather by the diversion of flow (and subsequent removal of load) to the pit. The @Risk effectiveness for the uncaptured flow will be 0% (no concentration reduction), since the remaining hydrograph is not treated by the TE.

Routing storm water to the Berkeley Pit eventually results in treating the water at the Horseshoe Bend Water Treatment Plant. The relationship between loads upstream of Porphyry Street to the outfall of BG should be evaluated prior to any potential implementation as removing this water from the system and treating it at Horseshoe Bend Water Treatment Facility may result in higher COC concentrations reaching Silver Bow Creek.

2.2 TE4 Efficiency – Detention/Retention Basins

The TE4, Installation of Detention/Retention Basins (catch basins) includes a conceptual detention basin for the BG drainage and a conceptual detention basin for MSD drainage. Detention basins are designed to detain storm water runoff for a predetermined period of time to facilitate settling suspended sediments from the water column (EMC^2 and WWC, 2010). The catch basin outlets have been sized to provide 24-hour centroid detention time for the 10-year 24-hour Type I rainfall event (Pioneer, 2015c). Because the storm water quality measurements are based on a total recoverable metals (unfiltered) basis, the discharge from the detention basins should be less contaminated than the detention basin inlet flow due to passive settling occurring in the basins. The following analyses evaluate the potential efficiencies for these two basins and conclude with a suggested range of effectiveness to be used in the @Risk model for TE4.

2.2.1 Representative Sediment Data

Storm water runoff suspended sediment samples were collected using an automated sampler on June 16 and August 12, 2014. Sampling location BG-CLV-01 represents the outlet of BG near the conceptual inlet location of the BG detention basin (Figure 2). Sampling location MSD-CLV-3A is located near the outfall of the MSD near the conceptual inlet location of the MSD detention basin. The available sediment gradations from the two sampling events at the two representative locations are used to evaluate the potential effectiveness of TE4. Appendix A provides the sampled gradations and total recoverable metal concentrations for the expanded analysis results (Atlantic Richfield, 2014b). Details for the metal fractionation are also provided in Appendix A.

2.2.2 Analytical Settling Calculations

One approach to estimating the efficiency of a detention basin uses Stoke's Law fall velocity of a particle, average plug flow velocity in the basin, and the length and depth of the basin (Transportation Research Board, 1980). The time to settle is estimated by comparing the fall velocity of a particle to the operational depth of the pond, which is the depth of the pond between the maximum water surface and the outlet orifice invert. The assumption has been made that once the particle falls below the orifice invert, it does not discharge from the basin. This

assumption is conservative as it does not incorporate several variables including the potential for particle resuspension, collision with other particles or water molecules, and flow short-circuiting due to the development of preferential flow paths. The time to settle is then compared to the time it takes the flow to travel horizontally through the basin by dividing the basin length by the forward velocity. If the time to settle for the particle is less than the time for the particle to reach the end of the basin the particle is assumed to remain in the basin.

Appendix A includes the calculations for the two conceptual detention basins and the two separate storm sediment gradations to estimate the removal efficiency for total recoverable copper and silver. Total particulate copper and silver concentrations were converted to total recoverable concentrations by calculating the particulate concentration and developing a ratio of particulate to total recoverable (Appendix A).

Estimated total recoverable removal rates for copper and silver are presented in Table 2. The average removal efficiency for the MSD and BG basins for total recoverable copper is 38% and 51%, respectively, and for total recoverable silver is 51% to 56%. For both basins, the range of removal efficiency for total recoverable copper is 7% to 70%, and for total recoverable silver is 35% to 78%.

2.2.3 Empirical Removal Calculations

The *Synthesis of Highway Practice 70, Design of Sedimentation Basins* (Transportation Research Board, 1980) includes a plot (Figure 16 on page 15 of this report) of empirical data for detention time versus percent of load deposited. The data in this report are segregated into sand material and silt-clay material. The TE4 conceptual detention basins have centroid detention times of approximately 22 hours for a 5-year event and 24 hours for a 10-year event. At 22 to 24 hours detention time, the percent sand deposited is approximately 90% and percent silt-clay deposited is approximately 20%. These values were applied to the sampled gradations of BG-CLV-01 and MSD-CLV-3A to estimate the percentage of total recoverable copper and total recoverable silver that would be settled (Appendix A).

Estimated total recoverable removal rates for copper and silver are presented in Table 3. The average removal efficiency for the conceptual MSD and BG basins for total recoverable copper is 28% to 33%, respectively, and for total recoverable silver is 37% to 47%, respectively. For both basins, the range of removal efficiency for total recoverable copper is 5% to 61%, and for total recoverable silver is 27% to 68%.

2.2.4 Literature Efficiencies

The following literature sources were evaluated for published metal removal efficiencies for detention/retention basins:

- Preliminary Data Summary of Urban Storm Water Best Management Practices (EPA, 1999).
- National Pollutant Removal Performance Database (Center for Watershed Protection, 2007).

- University of New Hampshire Stormwater Center – 2009 Biannual Report (University of New Hampshire, 2009).

A summary of reported copper (or other) metal removal using detention/retention basins is in Table 4. These values should be used as a guide as the details of the studies are not explicitly known, including the following:

- Detention/retention time.
- Magnitude of runoff events monitored.
- Drainage areas captured.
- Magnitude and gradation of captured sediments.
- Copper or metal load associated with captured sediments.
- Distribution of metals on the sediment size fractions.
- The concentration of dissolved metals.

2.2.5 Missoula Gulch Catch Basin Monitoring Data

The Missoula Gulch drainage has three catch basins that were installed in the late 90s (TD&H, 1997). Catch Basin 1 (Syndicate Pit, CB-1) is located near the top of the Missoula Gulch drainage and Empire Street. Catch Basin 8 (CB-8) is located immediately down-gradient from West Iron Street. Catch Basin 9 (CB-9) is located down-gradient of CB-8 and just above Centennial Avenue. The combined catch basins have storage capacity for the runoff volume of a 10-year, 24-hour storm (38 acre-feet; TD&H, 1997). The orifice designs allowed the 10-year storm to drain in 24 hours (TD&H, 1997). A previous analysis (EMC^2 and WWC, 2010) evaluated CB-8 sampling data from 2004 for total recoverable copper. Appendix A includes a figure showing the percent reduction for CB8 (EMC^2 and WWC, 2010). The data showed total recoverable copper removal of 74% to 97% for a 24-hour sampling interval with an approximate lower bound of 80%.

The 2004 sample data for CB-8 were collected during a short-term monitoring period following the installation of a bypass system to collect base flow and route it around the catch basin (TREC, 2005). The collected data are not directly applicable to the TE4 catch basins for the following reasons:

- **Detention volume:** MSD and BG basins are sized to detain the 10-year/24-hour storm event while CB-8 is designed to retain 60% (23 acre-feet) of the total design volume (TD&H, 1997).
- **Infiltration:** Detained storm water is able to infiltrate through the bottom of CB-8.
- **Sampling:**
  - Inflow samples were collected with a single automatic DTEC sampler characterizing an average inflow concentration over the time of the sample collection.
  - Typically the “out” samples (SS-CB8P) for CB-8 were collected within the pond near the outlet structure on first, third, and fifth monitoring days before being released to CB-9 (TREC, 2005).

- **Detention Times:**
  - The "detention time" (shown on the figure in Appendix A) represents the time between samples and not the detention time between an inflow and outflow event.
  - The detention time in CB-8 was typically over a 3 to 7 day period (TREC, 2005).
- **Operation:** The operation of CB8 during the 2004 and 2005 sampling events was not typical of a flow-through detention pond; water was manually released by adjusting weir gates to allow the pool volume to drain (TREC, 2005).
- **Mixing with previously detained water:** Sampling results were affected by overlapping wet weather events and occasional plugging of the base flow bypass allowing base flow water to mix with the storm water pool (TREC, 2005), essentially diluting the concentrations within the detention basin.

Based on the reasons above, the CB-8 monitoring data are not applicable to the assumptions of a detention basin. This removal efficiency range is included in Table 5 for completeness, but was not used to evaluate the potential range of effectiveness for TE4.

2.2.6 TE4 Efficiency Summary

Table 5 provides a summary of potential efficiencies for TE4 from analytical calculations, empirical calculations, CB-8 monitoring data, and literature values that range from 1% to 97%. All these removal efficiency ranges have limitations. Based on the rationale provided in Section 2.2.5, the values for CB-8 are not representative of a dry detention basin, and have not been used in the determination of the TI recommended range. The values from national literature studies are a rough guide for values but may not correlate well with the site-specific conditions observed within BPSOU. The analytical settling calculations are based on Stoke's law and two site-specific runoff sampling events, and two samples may not be fully representative of site conditions. During the January 13, 2015, TI technical group meeting, the technical group decided that it was not appropriate to select a single value based on the large differences in the calculated and literature values and the variability inherent to storm water events. Therefore, an applicable range of 5% to 70% was recommended to be an appropriate effectiveness range for TE4 within the @Risk model (Table 5).

2.3 TE6 Efficiency – Hydrodynamic Device

The EPA issued a Unilateral Administrative Order (UAO) for partial remedial design/remedial action implementation and certain operation and maintenance for BPSOU in 2011 (EPA, 2011). Section 2.4 E. of the UAO required that HDs be constructed at the following six locations:

- Texas Avenue.
- Warren Avenue.
- Anaconda Road.
- Montana Street.
- Buffalo Gulch – Holland and Main Street (Front Street).
- Buffalo Gulch – Front and Dakota Street (Webster-Garfield).

To date, the HDs have been installed with exception of the Buffalo Gulch – Front Street location. Each HD site is located near the base of the Butte Hill and is located on existing storm water mains upgradient from the storm water outfalls. The purpose of the HDs at these locations is to capture sediments and associated contaminants before storm water is discharged to the MSD or to Silver Bow Creek.

The observed performance for the Buffalo Gulch-Webster Garfield HD was during 2014 (Appendix A). Data collected according to the *Hydrodynamic Device Sampling and Analysis Plan* (Addendum 2 of the BPSOU Interim Surface Water Monitoring Plan) (Atlantic Richfield, 2014a) and the *Expanded Analysis Surface Water Monitoring Plan* (Addendum 3 to Draft Interim Surface Water Monitoring Plan) (Atlantic Richfield, 2014b) were used to develop the following removal efficiencies:

- 0 to 96% for total suspended solids (TSS).
- 0 to 51% for arsenic.
- 0 to 51% for total recoverable cadmium.
- 0 to 47% for total recoverable copper.
- 0 to 42% for total recoverable lead.
- 0 to 67% for total recoverable zinc.

These efficiency ranges assume 100% design flow and that previously captured and accumulated sediments remain contained within the HD sump for the duration of the storm event (re-suspension or remobilization of sediment does not occur).

Literature recommendations provide sediment capture efficiency with respect to sediment gradation at incremental percentages of suggested design flow (i.e., the smallest grain fraction at a given percent of design flow that is expected to be collected in the HD). This relationship allows establishment of capture effectiveness for flows less than 100% of the design. The effectiveness of TE6 has been estimated in terms of COC removal efficiency for the duration of a 5-year, 24-hour storm event (Table 6). During the earlier portion of the hydrograph (when the HD sump is clean) for 100% design flow (i.e., 9.7 cubic feet per second [cfs]) the copper capture effectiveness is estimated to range from 0 to 47%. Once the HD sump fills with sediment (at an approximate time of 12.2 hours during the 5-year, 24-hour storm event) the capture effectiveness is assumed to be zero (Table 12).

2.4 TE10 Efficiency – Capture and Treat First Flush Retention Basins

The TE10 (Capture and Treat First Flush Retention Basins) includes conceptual retention basins for BG and MSD. These basins have been conceptually sized to retain 5% of the BG 10-year runoff volume (0.99 acre-feet) and 10% of the MSD 10-year runoff volume (3.84 acre-feet) (Pioneer, 2015c). The remaining volume of any storm greater than the conceptual volumes would bypass the retention basins and discharge directly to Silver Bow Creek. The retained water would be routed to the Butte Treatment Lagoons (BTL) at a flow rate of 100 gallons per minute (gpm) from each of the retention basins for a combined treatment flow of 200 gpm. The initial rationale behind the first flush retention basins was based on the assumption that the initial portion of a storm has higher COC concentrations than the later portion of the storm.

The following sections evaluate the rational of the first flush being higher in contamination, provide a suggested efficiency range to be used for any flow bypassing the first flush retention basins to be used in the @Risk model, and include a summary of the practicability of storm water treatment at the BTL (Appendix C). For the purposes of this TI evaluation, the flow captured by the first flush retention basins would be routed to BTL for treatment and is assumed to have a COC removal efficiency of 100%, whereas the flow that bypasses the retention basin is assumed to have a COC removal efficiency of 0% (Table 12).

2.4.1 Evaluation of Storm Water First Flush Concept

The concept of first flush is that higher COC concentrations are observed during the early portion of each storm. For the purposes of Tech Memo 3, the first flush is assumed to be "significant" if at least 80% of the total copper mass is transported in the first 30% of the volume discharged during rainfall events (Bertrand-Krajewski, 1998). Capturing the significant first flush volume provides a degree of leverage because the first flush mass would be at least 2.7 times greater than the first flush volume. To determine whether a first flush retention basin would capture a significant first flush, the evaluation has used storm water data collected at BG-CLV-1 and MSD-CLV-3A from 2013 through June of 2014 wet weather monitoring events. These data include discrete samples collected with automatic Isco water samplers (Isco samplers) throughout the storm hydrograph. These two sampling locations are representative of runoff that would route into the conceptual BG and MSD first flush retention basins. The total recoverable copper data at these sampling locations were analyzed to evaluate whether the first flush at these locations is significant.

Data from 2013 through June of 2014 are plotted on Figure 3 through Figure 6. The sample collection times for each wet weather event at the BG and MSD sampling locations were normalized to the time of the first sample (e.g., the first sample for each event occurred at time 0:00 [hours:minutes], second at time 0:15, third at 0:30, and so on) on Figure 3 through Figure 6. These figures show that there is a general decrease in magnitude of concentration with time, however the "goodness of fit" (R squared [r^2]) relationships are weak, most likely due to variant drainage surface and storm conditions (i.e., multiple sub-basins contributing at different times during the hydrograph). The variability in the magnitude of concentrations between storms is greater than the concentration magnitude within a single storm.

Several observed storms in 2013 and 2014 had cumulative volumes larger than the respective first flush retention basins. Existing data were evaluated to determine whether the first flush retention basins capture the maximum observed concentration for each storm or not. For each storm event in 2013 through June of 2014, concentrations were normalized to the maximum concentration of that storm and compared to the cumulative flow volume for each storm (Figure 7 through Figure 10). Each event on these figures has been displayed as a separate series to show how concentration varies within each storm. Note that several of the monitored storms were not included on these figures because inconsistencies occurred between the start of sampling and the flow measurements. The volume where the first flush retention basin would be full (assuming the 0.99 acre-feet BG basin and 3.84 acre-feet MSD basin were empty at the beginning of the storm, Table 1) is represented by a vertical red line on Figure 7 through Figure 9. This comparison shows that 13 observed storms had a cumulative volume larger than the respective first flush retention basin volume (Figure 10). Of these 13 observed storms, the first flush retention basins

would have captured the maximum copper concentration for 5 storms, while the maximum concentration for 8 storms would have continued to Silver Bow Creek.

To evaluate whether any of the 2013 or 2014 storms observed at MSD-CLV-3A and BG-CLV-01 had a significant first flush, the cumulative mass has been compared to the cumulative storm water volume to generate dimensionless M(V) curves (Bertrand-Krajewski, 1998). These curves indicate the distribution of cumulative copper mass versus cumulative volume per storm event. The "M" in the M(V) curve is plotted on the "Y" axis, and represents the cumulative mass divided by total mass. The "(V)" in the M(V) curve is plotted on the "X" axis, and represents the cumulative volume divided by total volume (Figure 11 and Figure 12). Using this approach, a storm event with a constant ratio of M to (V) would graph as a straight line from coordinates (0,0) to (1,1); a storm with more mass per unit volume at the beginning of the storm would graph above this line, and a storm event with less mass per unit volume at the beginning of the storm would graph below this line. A first flush is assumed to be "significant" if during a storm event a minimum of 80% of the M is present within 30% of the (V) (Figure 11).

Based on the M(V) plots provided on Figure 11 and Figure 12, there were no observed storm events that classify as a significant first flush. On average there is very little additional load in the first flush portion of storms. In general at MSD-CLV-3A, an average of 31% M is captured with the first 30% (V) (Table 7), while at BG-CLV-01, an average of 33% M is captured with the first 30% of (V) (Table 8). Overall, there is less than a 5% chance of a significant first flush occurring at either MSD-CLV-3A or BG-CLV-01 (assuming the data are normally distributed). As shown on Table 7 and Table 8, the 95% confidence limit indicates that for MSD-CLV-3A, 95% of the data lie between an M value range of 12 to 50 % at 30% (V), while at MSD-CLV-3A, 95% of the data lie between an M value range of 2 to 63% at 30% (V). Because these ranges do not approach the significant first flush threshold of 80%M to 30% (V) that is characteristic of a significant first flush, these data suggest that the probability of a significant first flush occurring at MSD-CLV-3A or BG-CLV-01 is less than 5%.

2.4.2 TE10 First Flush Retention Basin @Risk Efficiency Summary

If the first flushes observed at MSD-CLV-3A and BG-CLV-01 had been significant, (i.e., a minimum of 80% M to 30% (V), the quality of the water bypassing the first flush basins could be estimated by using flows and concentrations from the portion of the hydrograph that was not captured to generate a modified PDF. Because the first flush concept is not significant (Section 2.4.2), the variation of concentration within each storm is not significant, and the average or maximum concentration may be used for an initial concentration. The approach to simulate a first flush retention pond with the @Risk model should be based on flow diversion. Similar to TE2, Diversion of Buffalo Gulch via Belmont Extension, the modified hydrographs would reduce flow in the HydroCAD model to 0 at BG-01 from 0 to 9.7 hours and at MSD-3A from 0 to 10.8 hours, respectively (Table 12). For the portion of the hydrograph where flow is removed, the @Risk effectiveness would essentially be 100% (no flow from BG-01 to Silver Bow Creek), and for the portion of the hydrograph that bypasses the first flush retention basins, the @Risk effectiveness should be 0% (Table 12). Note that modified hydrographs for BG-01 and MSD-3A were previously provided in Attachment C of Tech Memo 2 (Pioneer, 2015c).

2.4.3 Practicability of Treating Storm Water at the Butte Treatment Lagoons

A bench-scale evaluation of the practicability of treating storm water at the BTL has been provided in Appendix C. This evaluation suggests that treatment of storm water from the BG and MSD sub-drainages would likely increase the chance of exceeding the current BTL discharge targets. In general, the following conclusions can be made from the report:

1. The key to consistent compliance at the BTL system is a uniform influent. The storm water flow and chemistry varied significantly throughout the evaluation. Adding 200 gpm of storm water to the BTL increases system variability and the chance of exceeding the BTL discharge targets while simultaneously shortening retention and settling times within the BTL system. Changes to retention time may reduce the overall effectiveness of the treatment system and were not evaluated during the bench-scale evaluation.
2. The BTL influent flows are typically above average or near the BTL system design capacity of 1,880 gpm during wet weather. To prevent total influent flow to BTL from exceeding the design capacity, storm water captured in the first flush retention basins may have to be retained for extended periods of time and released through appropriate infrastructure at a consistent rate.

It should be noted that although the bench-scale effort provided valuable information, only chemical effects were evaluated. There are multiple critical parameters that cannot be simulated under laboratory conditions. If treatment of storm water at the BTL is considered further, additional evaluation (including a pilot-scale test) would be required to more accurately predict changes to the system's hydraulic capacity, sediment settling, and chemical ability to effectively treat storm water influent while meeting the appropriate discharge targets.

2.5 TE13 Efficiency – Hydrodynamic Device Filters

The HD Filter TE presumes installation of Contech StormFilter-manufactured filtration units (or similar devices) downstream of the four existing HDs and the one proposed HD on Front Street (Table 9, Section 2.3). The Contech StormFilter is available with several types of treatment media; for the purposes of this TI evaluation, media types have been selected that remove particulate and dissolved contaminant loads through both physical filtration and chemical treatment processes to maximize removal of total recoverable and dissolved metals from the effluent stream of each unit. To determine the total treated flow for the TI evaluation, the total treatment capacity of the HD filters has been limited to 25% of the average annual runoff from the Butte Hill (Table 1). To promote effective removal efficiencies and reduce recurrent maintenance, influent flow to the filtration units would be limited to the manufacturers recommended flow of 1 gpm per square foot of available new media surface area. For a standard 18-inch Contech StormFilter cartridge, this equates to an approximate design flow rate of 7.5 gpm per cartridge. The drainages evaluated for TE13, associated drainage design flow rates, and the total number of cartridges required for each is summarized in Table 9. All event flow above the design flow rates would bypass each filtration unit and report to downstream receiving waters.

2.5.1 Representative Data

The data used to evaluate TE13 came from the expanded analysis sampling (Atlantic Richfield, 2014b) of the events occurring on June 16, June 17, July 15, July 23, and August 12, 2014, for the five locations listed in Table 9 and shown on Figure 2.The expanded analysis sampling effort produced data specific to the outflow of existing and proposed HD locations. The data used to evaluate TE13 included TSS, specific sediment gradations and metals fractionation to each sediment size class, and total recoverable and dissolved copper concentrations. Specific data values and parameters used can be found in Appendix D.

2.5.2 Relationship to Hydrodynamic Devices and Filter Occlusion

Sediment load reaching filtration devices can adversely impact removal performance and required maintenance frequencies. Upon exposure to contaminated influent flow the removal efficiency of filtration devices begins to decrease. As silts and clays continue to accumulate on the surface and within the body of filtration media, the physical and chemical treatment capacity of the device is inhibited until reaching a point of occlusion. Once a filter cartridge has occluded, the filtration device realizes an effective removal efficiency of zero and requires maintenance through media replacement or regeneration. To minimize maintenance frequency, each filter unit would ideally be paired with an HD (or other pretreatment device) that is operated and maintained according to manufacturer recommendations or in a sub-drainage with minimal sediment load.

In general, a filter vault system with greater than 2 to 3 inches of accumulated floor sediment is in need of maintenance to ensure continued performance (Contech reports via email, February 9, 2014). To estimate the time to filter occlusion at the assumed treatment flows, it is expected that 60% of sediment (medium to coarse silt and sand) entering the vault settles to the floor, with the remaining 40% of solids (fine sand, silt, and clay) captured in the filter media (assumed 18-inch cartridges at 7.5 gpm/cartridge).

For each 18-inch cartridge, Contech recommends a maximum allowed cartridge media loading of 36 pounds of sediment per 18-inch cartridge before complete filter occlusion occurs (actual performance would be site specific). Average time until reaching complete occlusion has been calculated with respect to anticipated design flows and the required number of cartridges in each sub-drainage system. The average time to complete occlusion for the Butte Hill sub-drainages (for a specific flow rate of 1 gpm per square foot or 7.5 gpm) has been estimated to be approximately 2.1 days, which is longer than the duration of the 5-year, 24-hour storm event hydrograph. As previously stated, the removal efficiency of the filtration devices will incrementally decrease upon initial exposure to contaminated influent flow until reaching occlusion.

On a drainage-specific basis however, it is estimated that the HD filters installed at TX-HD-1and at BF-CH-B3 (Front Street) would be susceptible to occlusion prior to completion of the 5-year/24-hour storm event. Based on the expanded analysis data, it is estimated that TX-HD-1 would reach occlusion at a time of 9.6 hours and that BF-CH-B3 would reach occlusion at a time of 14.0 hours (Table 10, Table 12, and Appendix D).

It should be noted that, similar to observed HD function, it is possible that contaminants settled on the vault floor would be subject to remobilization and produce negative removal efficiencies. This potential for remobilization was not accounted for during the estimate of COC efficiency removal.

2.5.3 HD Filters Efficiency Review

The following estimates represent a summary of HD filter efficiency based on national literature and study values, analytical performance calculations, and Contech literature values to provide a TI recommended range of filter efficiency. It should be noted that storm water conditions on the Butte Hill are unique, and if further consideration is given to HD filters as a BMP, site-specific pilot studies would be recommended for additional evaluation related to site-specific performance.

2.5.3.1 Analytical Performance Calculations

Similar to TE4 and TE6, evaluation of TE13 relied upon measured sediment mass per gradation and resultant mass copper fractionation from the expanded analysis results (Atlantic Richfield, 2014b). The reported ability of various StormFilter media to remove specific particle size diameters (PSDs) of sediment was applied to the ratios of particulate copper to total recoverable copper and of dissolved copper to total recoverable copper. This resulted in determination of total and dissolved removal efficiencies of various StormFilter media across the target sub-drainages for multiple storm events. Three Contech media gradations were used to show variation in performance efficiency: Perlite/MetalRx hybrid media, Perlite/CSF leaf media hybrid, and CSF leaf media. Tabular calculations for drainage-specific removal efficiencies are provided in Appendix D. Figure 13 provides a performance summary for the June and July 2014 events (averaged across AR-MH-1, TX-MH-1, WA-MH-1, BG-CLV-1, and BG-CH-B3). Figure 14 provides a performance summary for the August 12, 2014, event (averaged across AR-MH-1, TX-MH-1, WA-MH-1, and BG-CLV-1).

2.5.3.2 Literature Efficiencies

The following literature sources were reviewed for published total recoverable and dissolved removal efficiencies by filtration technologies:

- International Stormwater Best Management Practices Database.
- EPA’s National Pollutant Removal Performance Database (Center for Watershed Protection, 2000 and 2007).
- EPA’s National Urban Runoff Program (EPA, 1983).
- EPA’s Preliminary Data Summary of Urban Storm Water BMPs.

Additional removal efficiencies were obtained directly from Contech or their affiliate vendors. The performance efficiencies reported by Contech have been segregated from other published values to reduce the potential for TE13 evaluation bias.

- Contech Engineered Solutions CSF® Leaf Media: Background & Summary of Studies (Contech Engineering Solutions, 2009).
- Treatment of Roof Runoff for Zinc by Filtration Media Performance Evaluation - Port of Seattle, Seattle-Tacoma International Airport.

Contech also provided general guidance through electronic mail correspondence. Direct correspondence between Pioneer and Contech is included as Appendix E.

The total recoverable copper removal efficiencies reported within general literature sources vary from 27% to 57% and from 30% to 60% for literature originated or supported by Contech. A summary of literature and Contech reported total recoverable and dissolved removal efficiencies is shown in Figure 15. The values presented in the figure apply to "categorical filtration" technologies, and are not necessarily representative of Contech StormFilter products or MetalRx, CSF, or hybrid media types.

The total recoverable and dissolved removal efficiencies reported within general literature sources vary from 22% to 33%. Contech provided a mean dissolved removal efficiency value of 39%. A mean dissolved copper removal efficiency of 37% was reported in the *Treatment of Roof Runoff for Zinc Removal by Filtration Media Performance Evaluation Port of Seattle Seattle-Tacoma International Airport Comprehensive Stormwater Management Program* (Taylor Associates, 2006). The values presented in Figure 16 apply to "categorical filtration" technologies, and are not necessarily specific to Contech StormFilter products or MetalRx, CSF, or hybrid media types.

Additional specific searches of the International Stormwater BMP Database (Water Environment Research Foundation, et al., 2015) yielded study-specific statistics regarding total and total recoverable and dissolved removal efficiencies by manufactured devices containing the keyword "stormfilter." The total recoverable copper removal efficiencies reported within the database studies vary from (-) 1% to 64%, and from (-) 28% to 32% for total recoverable and dissolved. Although related to Contech StormFilter technology, the values presented in Figure 17 are not necessarily specific to MetalRx, CSF, or other hybrid media types.

2.5.4 TE13 Hydrodynamic Devices Filter Efficiency Summary

Table 11 shows a summary of potential total recoverable and dissolved copper removal efficiencies of TE13 based on analytical calculations and literature values. The values in Table 11 range from 5.0 to 56.8% for total recoverable copper removal and from 0.4 to 12.7% for dissolved copper removal based on analytical calculations. General literature and study values suggest removal efficiencies ranging from (-) 1 to 64% for total recoverable copper and from (-) 28 to 33% for dissolved copper. Literature values, provided by Contech, range in value from 30% to 65% for total recoverable copper and up to 39% for dissolved copper. Due to the variability of the analytical calculation and literature efficiencies, incrementally reduced efficiency of filtration upon exposure, the potential for occlusion, and the impact of sediment remobilization, it is recommended that two ranges be used for the TI evaluation: a range of 0 to 65% efficiency for all sub-drainages up to the calculated time of occlusion presented in Table 10;

and a 0% efficiency applied for all time during the 5-year, 24-hour storm event hydrograph following occlusion (Table 12).

3.0 CONCLUSIONS

For the purposes of the BPSOU Storm Water TI, various efficiency ranges have been estimated for TE2, TE4, TE6, TE10, and TE13. These efficiencies relate to the performance of TEs in reduction of total recoverable copper, and are based on available site data (Atlantic Richfield, 2014b), empirical data, general literature values, and in some instances manufacturer recommendations via correspondence. A summary of the overall efficiency rate for each TE, the portion of the hydrograph to which the efficiency applies to, and (if applicable), a time at which TE effectiveness decreases to zero is provided in Table 12. If any TEs evaluated within Tech Memo 3 are considered for implementation, a pilot-scale study is recommended.

4.0 REFERENCES

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FIGURES

TECHNICAL MEMORANDUM 3: BPSOU TECHNOLOGY ELEMENTS EFFICIENCY EVALUATION

Figure 1. BPSOU Storm Water Drainages and General Site Features
Figure 2. Metro Storm Drain Corridor General Features
Figure 3. 2013 Normalized Time BG-01 Total Recoverable Copper Monitoring
Figure 4. 2014 Normalized Time BG-01 Total Recoverable Copper Monitoring
Figure 5. 2013 Normalized Time MSD-3A Total Recoverable Copper Monitoring
Figure 6. 2014 Normalized Time MSD-3A Total Recoverable Copper Monitoring
Figure 7. 2013 BG-01 Normalized Concentration vs Cumulative Flow Volume
Figure 8. 2014 BG-01 Normalized Concentration vs. Cumulative Flow Volume
Figure 9. 2013 MSD-3A Normalized Concentration vs. Cumulative Flow Volume
Figure 10. 2014 MSD-3A Normalized Concentration vs. Cumulative Flow Volume
Figure 11. Comparison of MSD-3A M(V) Curves
Figure 12. Comparison of BG-01 M(V) Curves
Figure 13. Efficiency Summary for June and July, 2014 Expanded Analysis Events
Figure 14. Efficiency Summary for August 12, 2014 Expanded Analysis Event
Figure 15. Efficiency Summary of Total Copper Removal from General Literature and Contech Reported Values
Figure 16. Efficiency Summary of Dissolved Copper Removal from General Literature and Contech Reported Values
Figure 17. International Stormwater BMP Database Studies Removal Efficiencies for Manufactured Devices

LEGEND

- WATER SURFACE
- STREAM
- IMPACTED WATER COLLECTION AND CONVEYANCE CHANNEL
- BPSOU BOUNDARY

N

DISPLAYED AS:
PROJECTION/ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/BSB/NAIP 2013

0 1,000 2,000 4,000
Feet

FIGURE 1

PIONEER TECHNICAL SERVICES, INC.

BPSOU STORM WATER DRAINAGES AND GENERAL FEATURES

DATE: 2/25/2015

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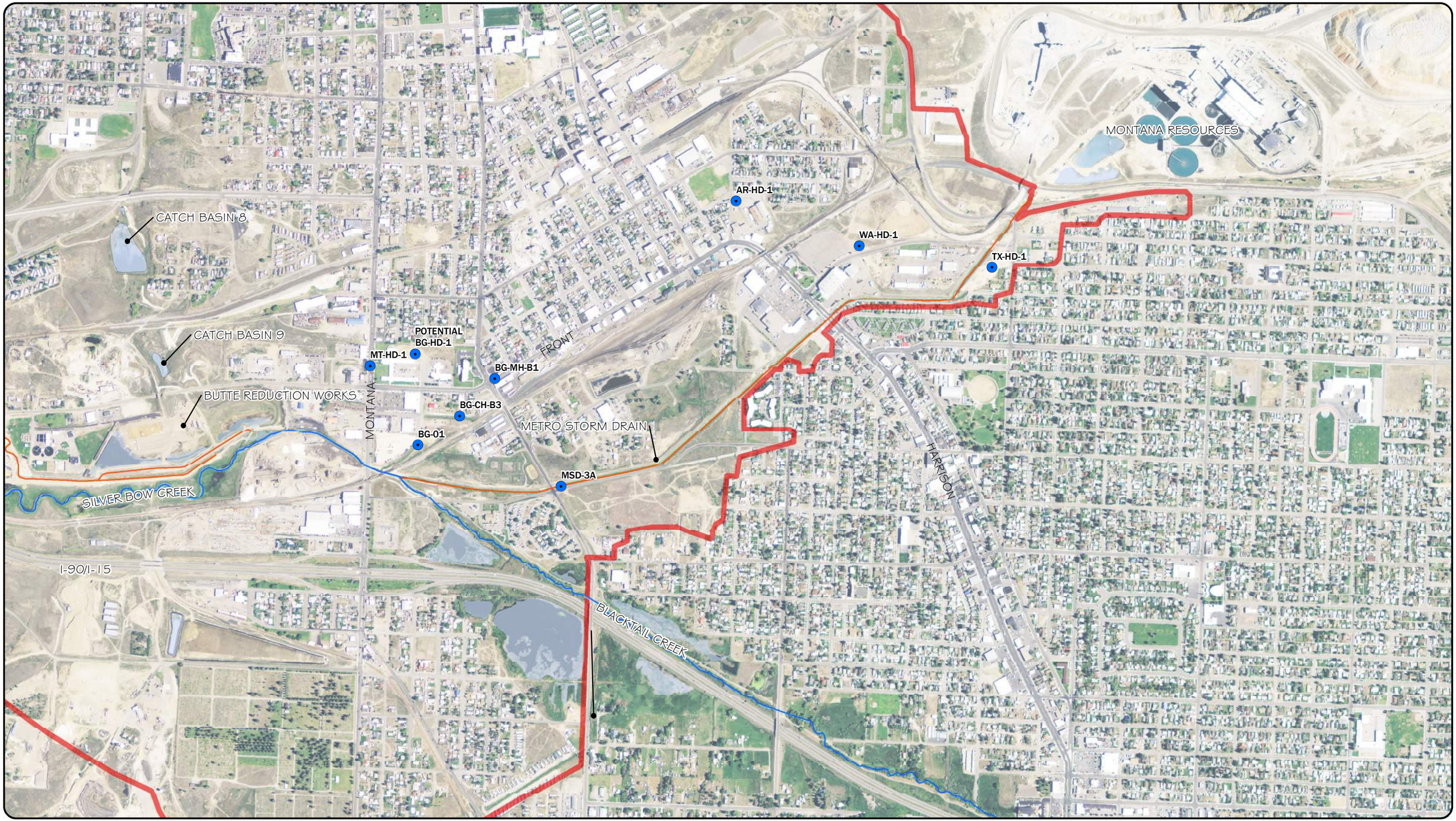

LEGEND

- STORM WATER SAMPLING LOCATION
- STREAM
- IMPACTED WATER COLLECTION AND CONVEYANCE CHANNEL
- WATER SURFACE
- BPSOU BOUNDARY

N

DISPLAYED AS:
PROJECTION/ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/BSB/NAIP 2013

0 500 1,000 2,000
Feet

FIGURE 2

PIONEER TECHNICAL SERVICES, INC.

METRO STORM DRAIN CORRIDOR GENERAL FEATURES

DATE: 2/25/2015

Path: P:\ARCO\BPSOU\2015\2014 TI Storm Water - Confidential\TM3\GIS\Project\TI_StrmWtr_GI-OPH-002-15.mxd

Figure 3. 2013 Normalized Time BG-01 Total Recoverable Copper Monitoring

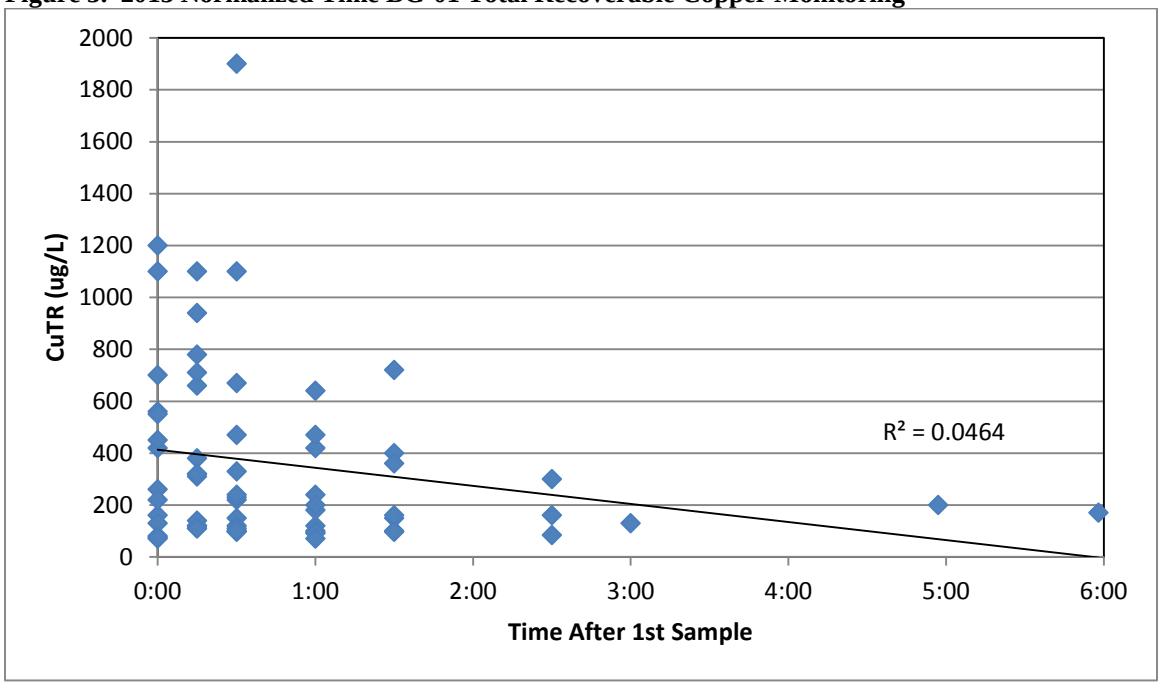

Figure 4. 2014 Normalized Time BG-01 Total Recoverable Copper Monitoring

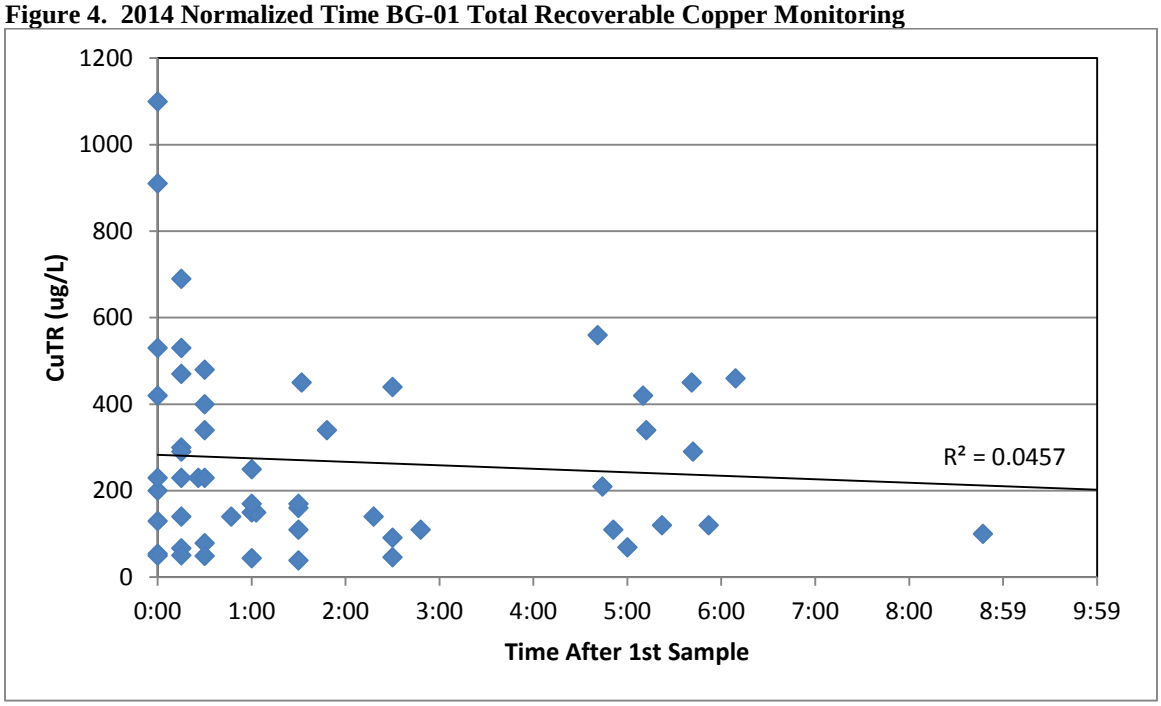

Figure 5. 2013 Normalized Time MSD-3A Total Recoverable Copper Monitoring

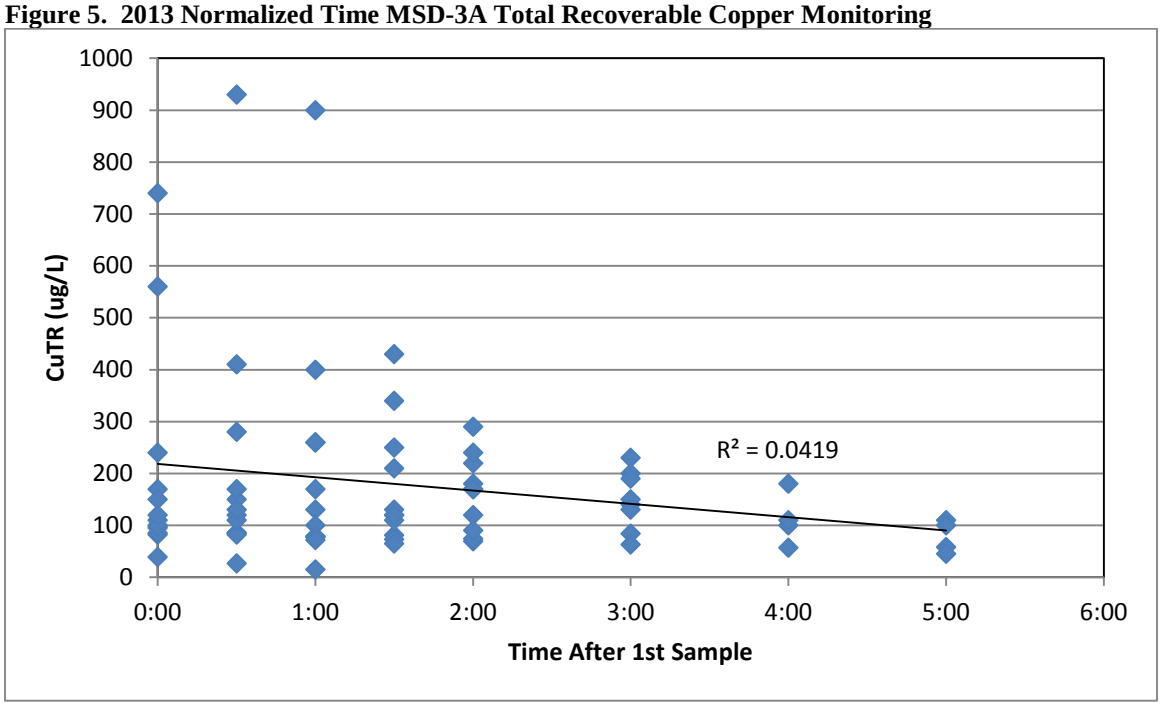

Figure 6. 2014 Normalized Time MSD-3A Total Recoverable Copper Monitoring

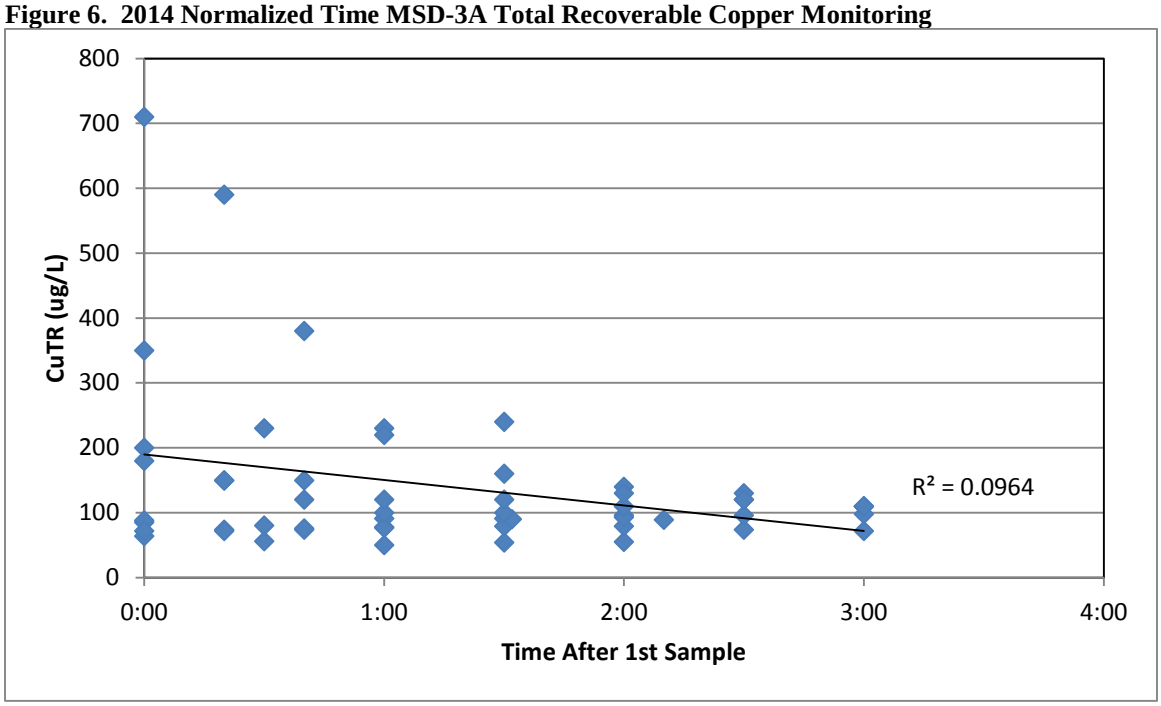

Figure 7. 2013 BG-01 Normalized Concentration vs Cumulative Flow Volume

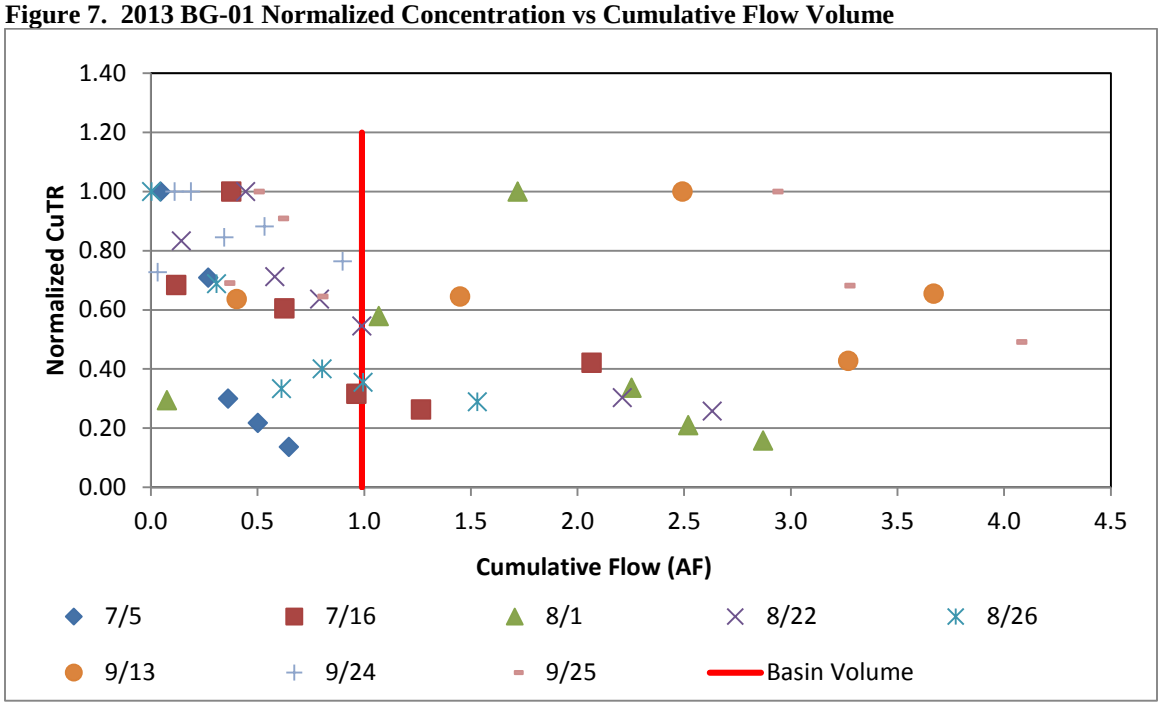

Figure 8. 2014 BG-01 Normalized Concentration vs. Cumulative Flow Volume

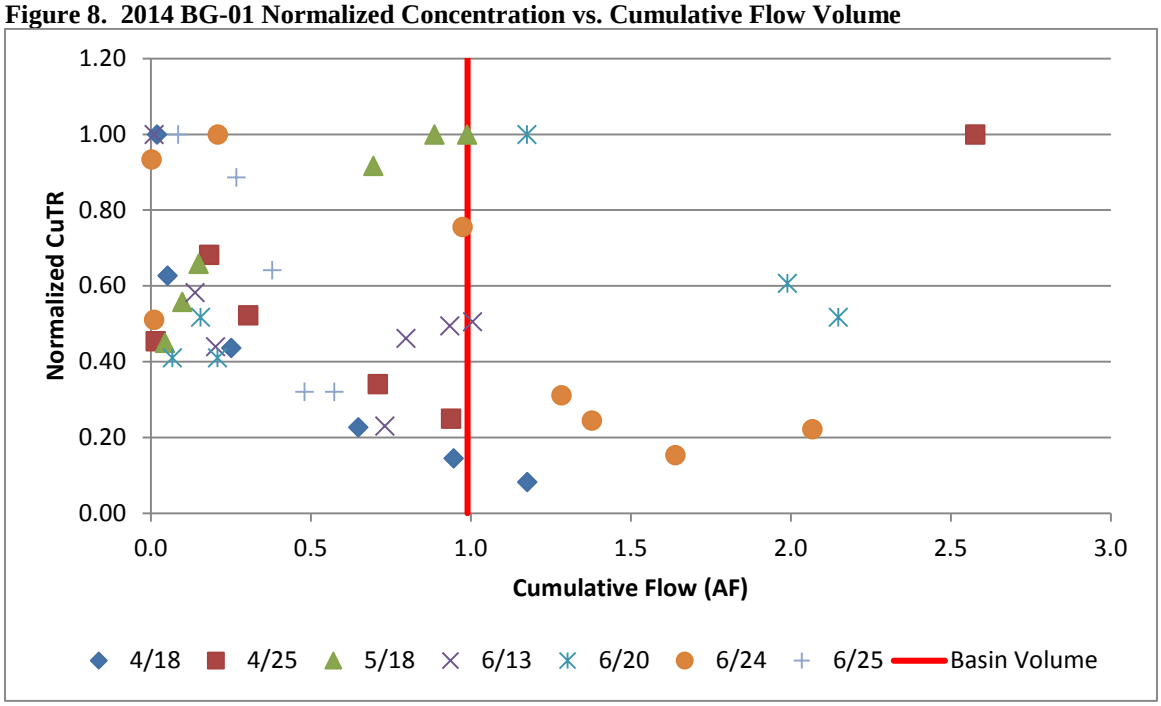

Figure 9. 2013 MSD-3A Normalized Concentration vs. Cumulative Flow Volume

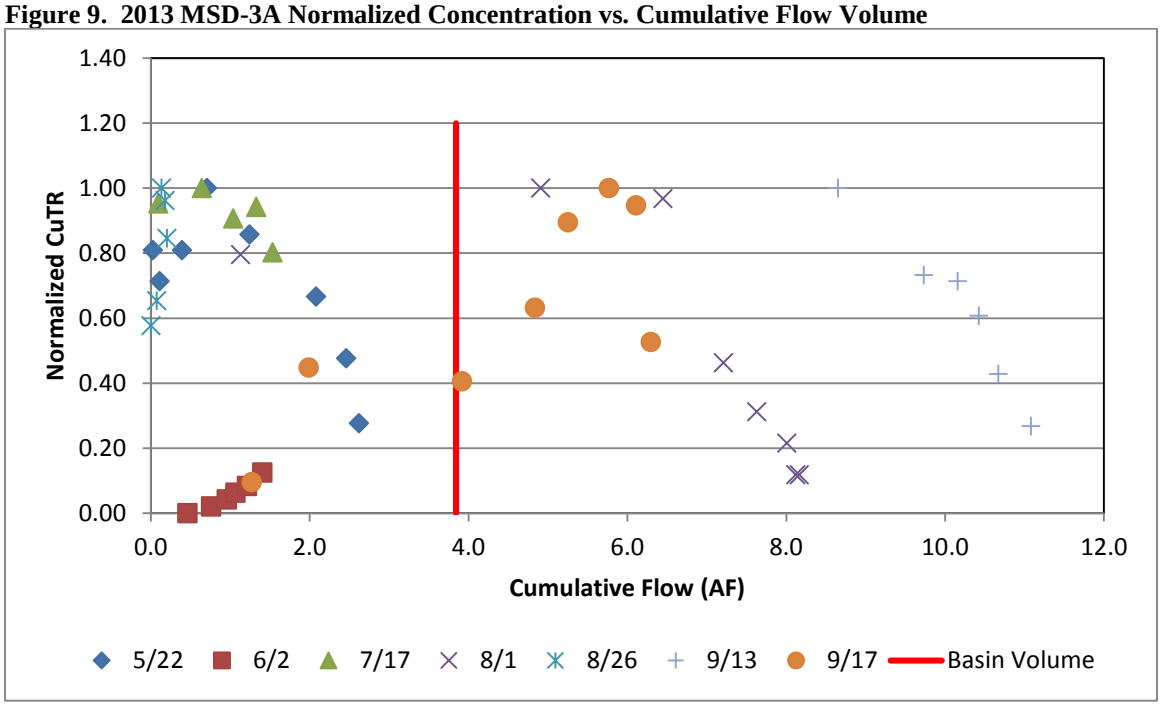

Figure 10. 2014 MSD-3A Normalized Concentration vs. Cumulative Flow Volume

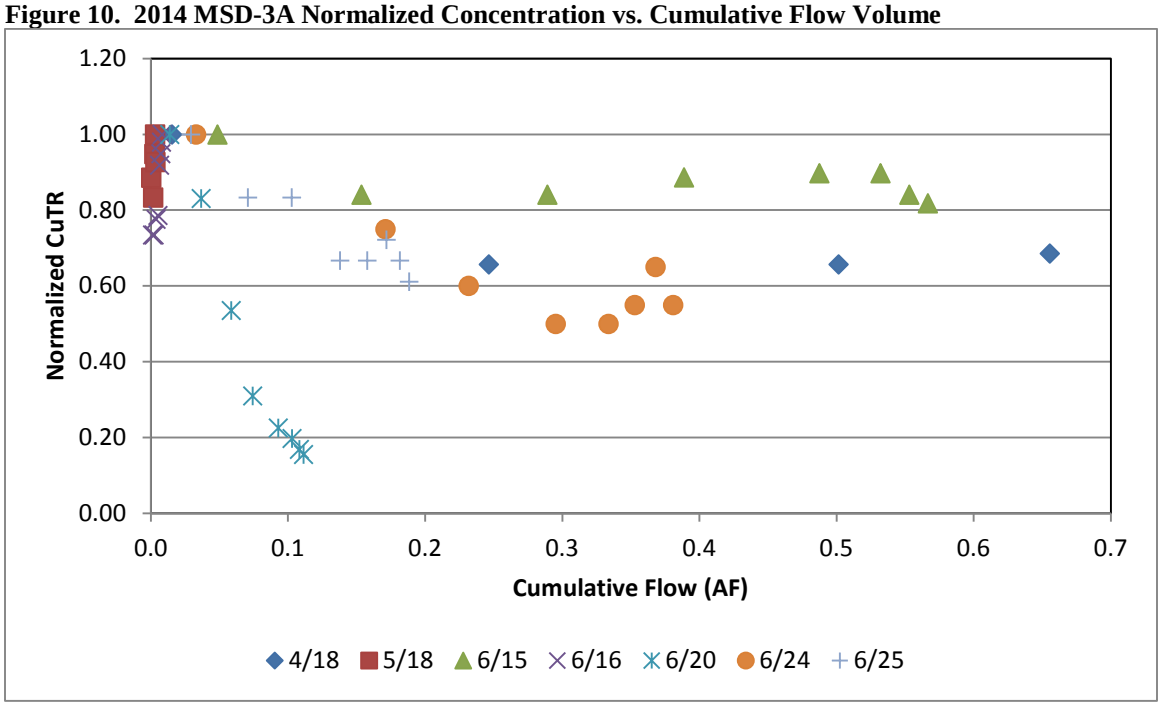

Figure 11. Comparison of MSD-3A M(V) Curves

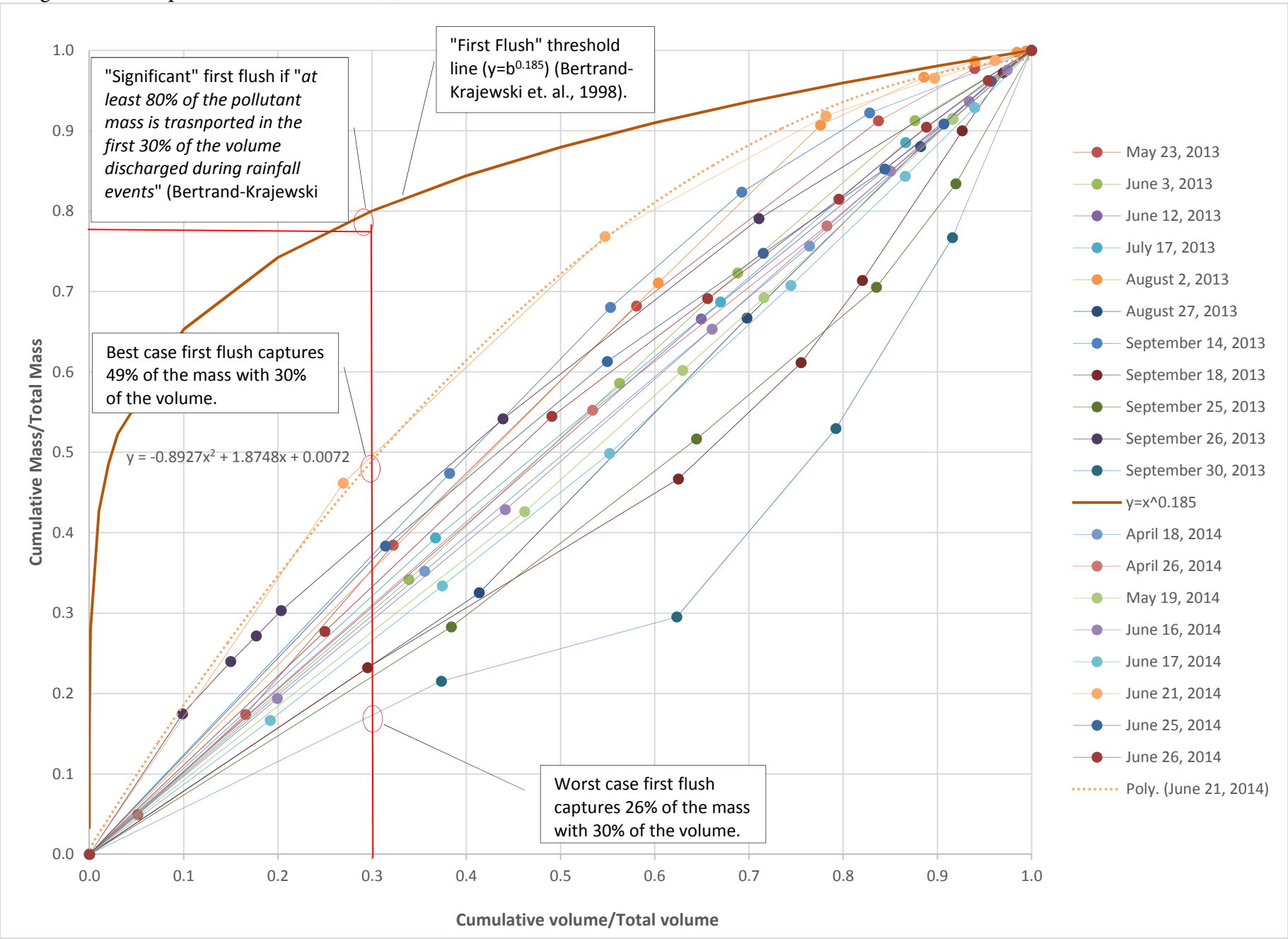

Figure 12. Comparison of BG-01 M(V) Curves

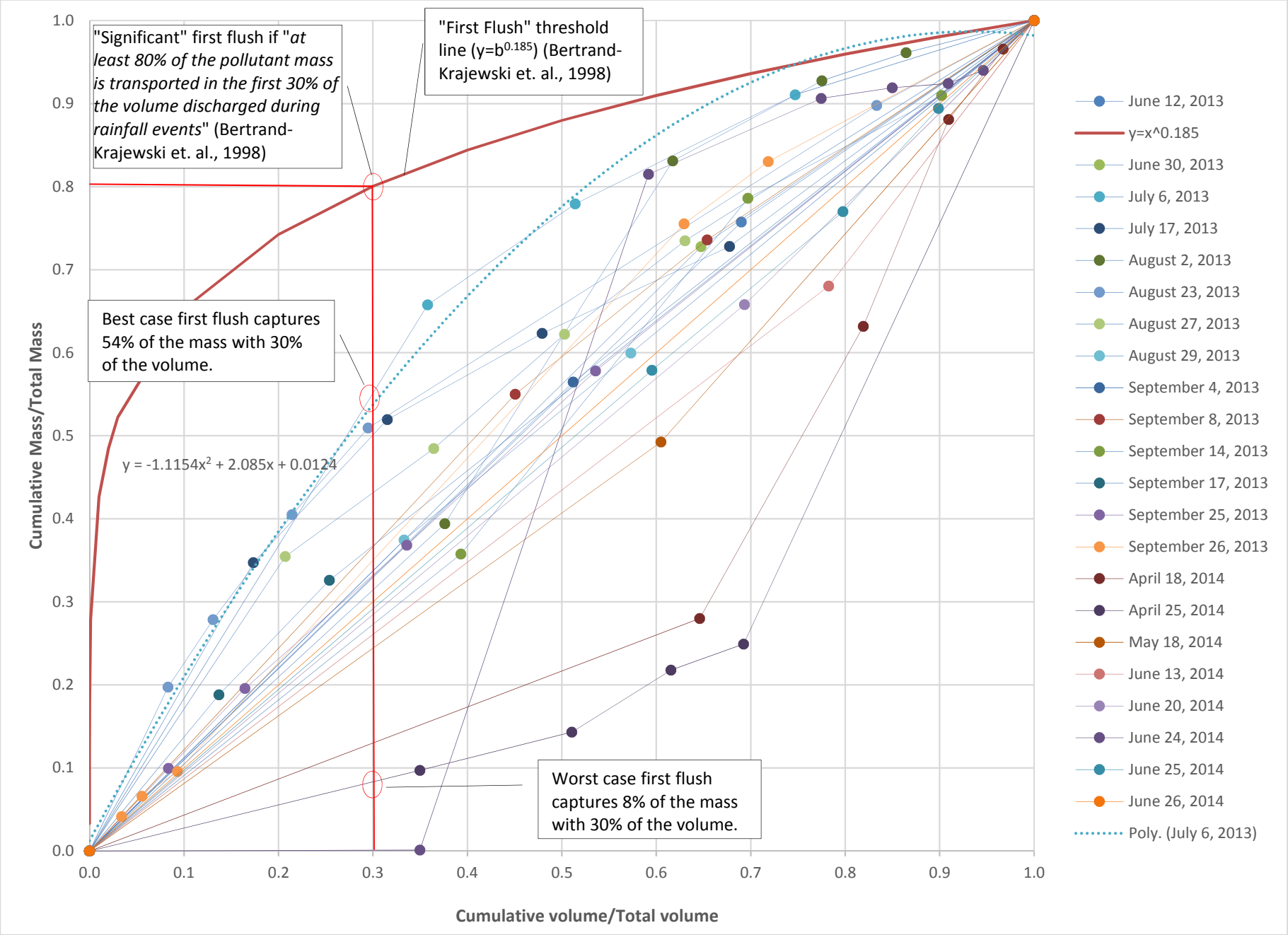

Figure 13. Efficiency Summary for June and July, 2014 Expanded Analysis Events

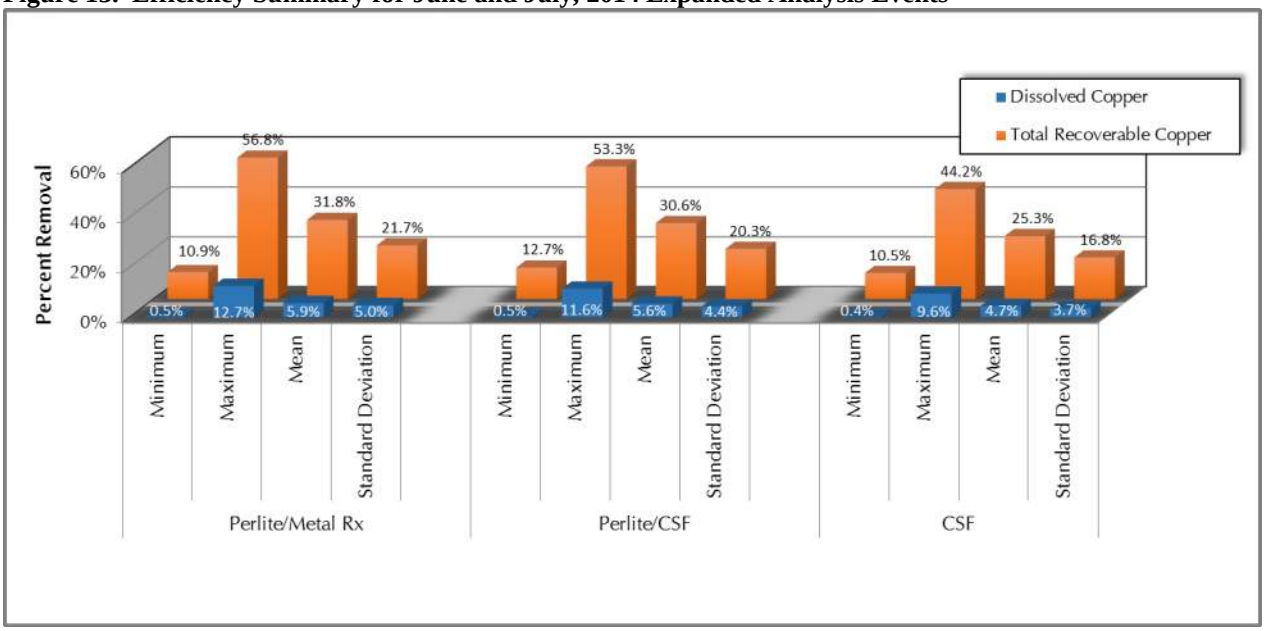

Figure 14. Efficiency Summary for August 12, 2014 Expanded Analysis Event

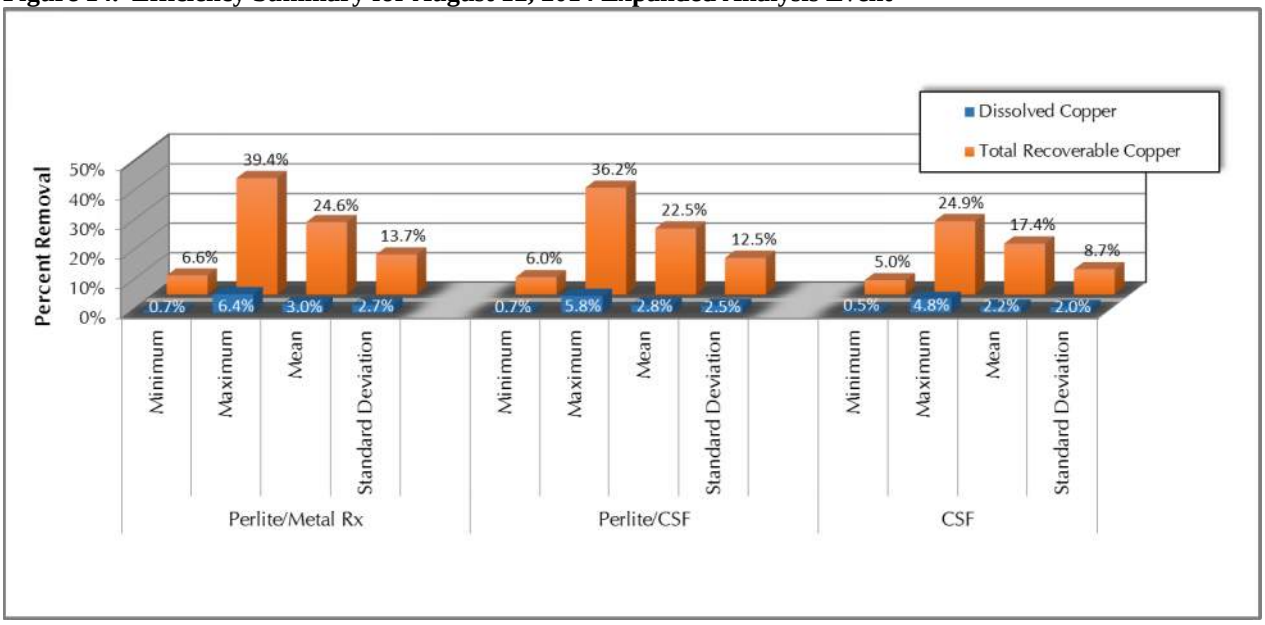

Figure 15. Efficiency Summary for Total Copper Removal from General Literature and Contech Reported Values

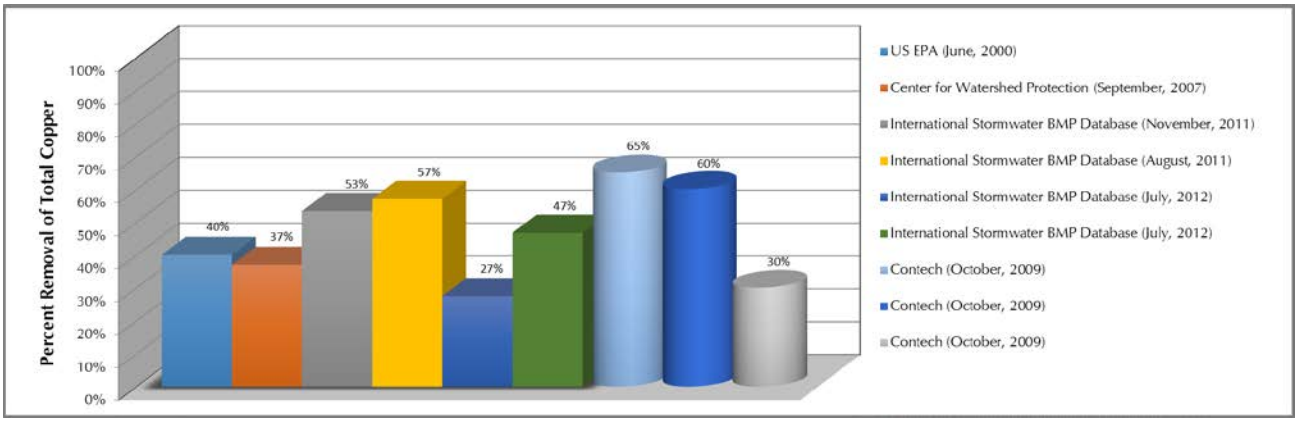

Figure 16. Efficiency Summary for Dissolved Copper Removal from General Literature and Contech Reported Values

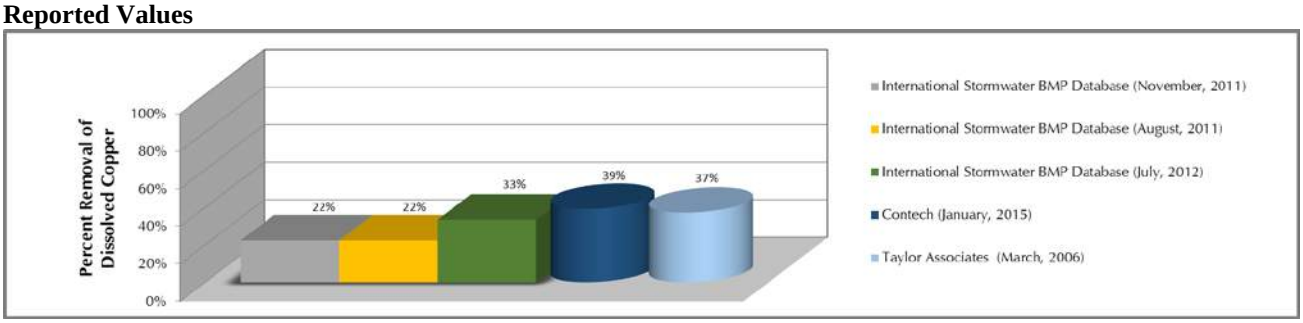

Figure 17. International Stormwater BMP Database Studies Removal Efficiencies for Manufactured Devices

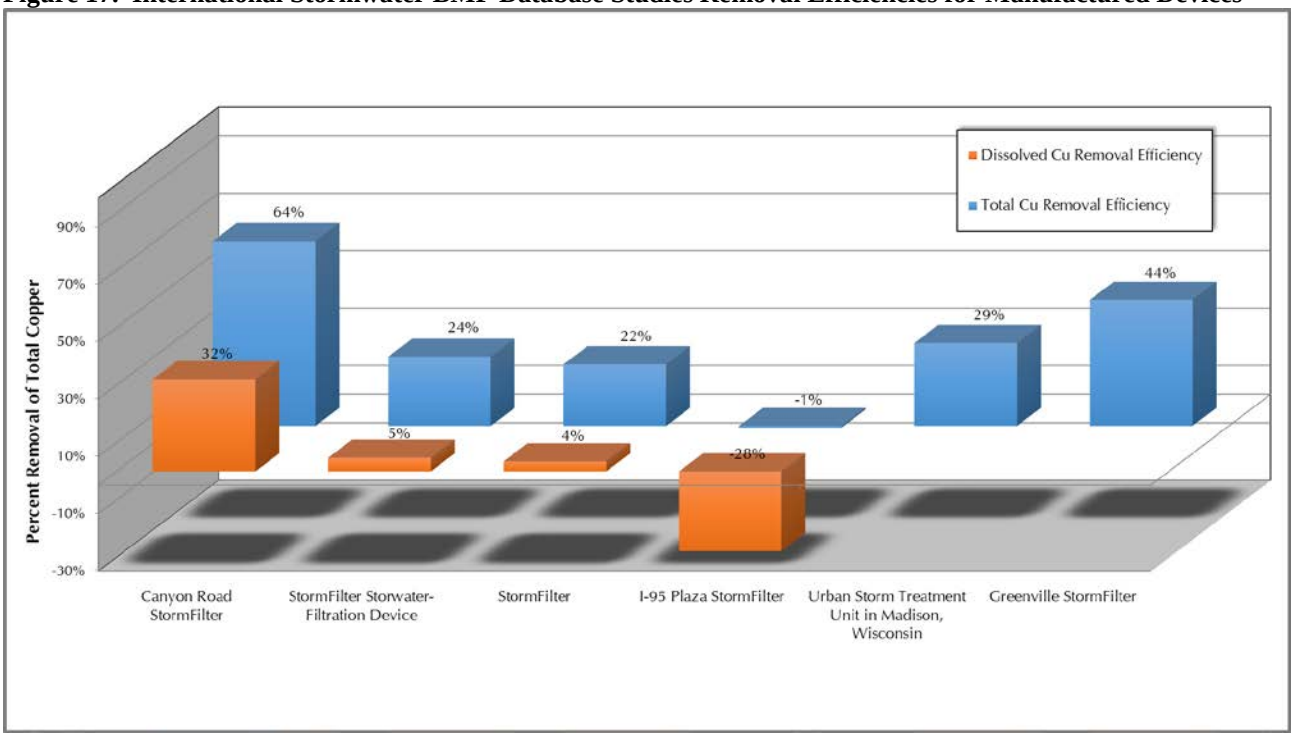

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Table 1: Final Revised Storm Water TI Assumption and Efficiency Matrix - Existing Technology Elements (TE)

Technology Element (TE)	Modified Description (Updated 1/20/2015)	Comments (EPA, February 5, 2015)	Revised Assumptions for Incorporating Each Technical Element into HydroCAD	Revised Efficiency Assumptions (2/24/2015)
TE 1	Diversion of Buffalo Gulch to Underground Workings	**NOT BEING CONSIDERED FOR THE 2014 TI**		
TE 2	Diversion of Buffalo Gulch storm water (above Porphyry Street) to the Berkeley Pit via the Belmont diversion	Reconsider this TE in the 2014 TI evaluation. Was not modeled in 2010	**(1) Assumptions** ● Assume 90% capture of 10-year/24-hour storm and 5-year/24-hour storm (Reduction to account for overland flow). **(2) Approach** ● Route BG at Porphyry to pit within HydroCAD model ● Remaining 10% continues to SBC using a flow multiplier	**(1) Efficiency:** ● For flow diverted to Pit: Treatment efficiency is 100% ● Overland Flow **:** No treatment
TE 3	Diversion of West Side Drain Base Flow to the Underground	**NOT BEING CONSIDERED FOR THE 2014 TI**		
TE 4	Installation of detention/retention basins	In 2010, only 2 out of the 9 catch basins were considered. The 2014 TI will consider 7 of the 9 catch basins proposed in 2010 TI Appendix D-3. The space for the MSD-Locust catch basin has already been in use for the Texas Avenue HDD and is no longer available, and therefore is not considered practicable.	**(1) Assumptions** ● MSD detention basin intercepts water from MSD channel downstream of East Buffalo Gulch and will be related to MSD-3A. ● BG detention basin located at base of drainage and will be related to BG-01. **(2) Approach** ● HydroCAD modified to include two detention basins sized to detain 10-year/24-hour runoff for 24 hours, as follows: ● BG: 19.8 acre-feet ● MSD: 38.4 acre-feet	**(1) Assumptions:** ● Detention basins start empty **(2) Efficiency:** (A) Efficiency based on using field data with Stoke's law and five sources of empirical data/literature, and field data from CB8/CB9. TM3 will provide a table listing these sources, the associated efficiencies, and the applicability. (B) Field Data + Theoretical: Combine metals fractionation and Stoke's law ● Likely overly conservative (does not account for potential short circuiting, wave factor, and/or other resuspension). ● Range of efficiency for 24-hour detention pond for Cu and Ag ranges from approximately 5 to 70%. (C) Empirical data/literature: Transportation Research Board - 1980 sed basins. ● Only accounts for two gradations of sands and silts/clays. Preliminary Data Summary of Urban Storm Water Best Management Practices National Pollutant Removal Performance Database University of New Hampshire Stormwater Center – 2009 Biannual Report (D) Field Data: ● Metals fractionation data from 2014 used in Stoke's law (see above). ● CB-1, CB-8, CB-9: ● CB-1 - No paired data ● CB-8 - No effluent data. Representativeness of CB-8 and CB-9 data will be discussed in the forthcoming Tech Memo 3. ● CB-9 - Data from 2001 to 2004, data were detained in CB-8 for 5 days and released to CB-9, and do not appear to be representative of a detention pond. ● Efficiency data from these catch basins will be referemced in TM3, along with an analysis on the applicability of the data . (E) Dissolved efficiency: ● Dissolved efficiency may be greater than zero, however for the purposes of this TI the dissolved efficiency is assumed to be zero because the technology is based on settling velocities ● Only total recoverable metals are being evaluated for the TI (F) Biological efficiency: ● Biological effects may increase efficiency slightly, however for the purposes of this TI biological effects have been assumed to be zero. **(3) Application** ● A range of efficiency for the 24-hour detention pond for Cu and Ag ranges from approximately 5 to 70% as per the January 13, 2015 BPSOU TI Meeting.
TE 5	Installation of sediment traps in MSD	**NOT BEING CONSIDERED FOR THE 2014 TI**		
TE 6	Installation of hydrodynamic devices (HDD's)	Possibly install HDD Devices on East Buffalo/Front Street	**(1) Assumptions** ● One HD added to model at Kaw and Front Street ● 2year/24-hour design HD (WWC, September 2012) ● Flow and water quality to be related to BG-MH-B1 **(2) Approach** ● 2-year/24-hour HD design inserted into HydroCAD model ● Diversion weir simulated to divert flow into the HD with no storage ● Overflow continues to SBC without treatment.	**(1) Assumptions:** ● HD starts empty **(2) Efficiency:** **(A) Empirical data/literature (USGS SIR 2010-5160)** ● Accounts for influent and effluent TSS gradation reductions. ● Combine TSS and metals gradation to determine % metals removal **(B) Field Data:** ● Utilize data following HD cleaning to determine % metals removal **(C) Dissolved efficiency:** ● Assume no treatment as technology is based on TSS removal **(3) Application** **(A) Treated vs. Non-Treated Flow** ● Treated flow for design flow rate ● Untreated flow for remaining 5-year flow rate **(B) Sediment Capacity Considerations** ● If HD vault projected to fill up with sediment from 5-year storm, would use % metals removed for HDs that are empty and not empty to represent appropriate portions of the hydrograph and weight accordingly **(C) Capacity Considerations** ● A range is expected for efficiency. ● When the sump on the HDD fills then the efficiency drops to 0% - this can happen during one 5-yr, 24-hour storm event. Tech memo 3 will address this issue.
TE 7	Additional Source Controls	This TE will be reconsidered using a general approach. Two "source control" sites will be applied to each of the subareas and no specific locations will be identified. May include a combination of sites and actions to prevent or mitigate storm water runoff from interacting with surface source areas.	**No modifications to HydroCAD model**	o Model will be run with a range of efficiencies to demonstrate differing levels of source control that can be achieved o An efficiency range of 3-10% will be used for the TE based on CDM Smith's 2/3/15 presentation o Overall source control area will equate to approximately 2 acres per sub-watershed over the entire Butte hill watershed, however the areas will be area weighted based on sub-watershed areas (i.e. larger sub-watersheds may have more than 2 acres)
TE 8	Replace buried trunk lines	This TE would be modified to include slip lining of the trunk lines in Texas, Warren, Locust, and Missoula Gulch.	**(1) Assumptions** ● Not incorporating any changes; assumes negligible changes to model results. **(2) Approach** ● No effective change to the HydroCAD model	Sufficient data does not exist to allow the slip lining of Buffalo Gulch to be isolated from other BMPs (HDD, source controls, etc.), therefore assumptions have to be made — likely low effectiveness o An efficiency range of 2-3% will be used based on CDM Smith's 2/3/15 presentation o The model will not address the reduction of interaction between groundwater and storm sewer system. This is not quantifiable

Table 1 (Cont'd): Final Revised Storm Water TI Assumption and Efficiency Matrix -- New Technology Elements (TE)

Technology Element(TE)	Description	Comments	Revised Assumptions for Incorporating Each Technical Element into HydroCAD (Updated with Agency Comments from 12/17/2014)	Revised Efficiency Assumptions (1/20/2015)
TE 9	Low Impact Development	Bio-retention filters in Buffalo Gulch catch basin and WL-12 catch basin.	**CDM Smith will modify HydroCAD model as necessary for bioretention basins, based on catch basins model provided with Tech Memo 2.**	o Proposed copper removal removal rates of 10-90% for stormwater that flows through media within the bioretention basins o Any stormwater that bypasses the bioretention basin will have 0% efficiency o Final treatment efficiency will be determined after reviewing catch basin (TE 4) fractioning data from Tech Memo 3 o Bio-retention basins will be applied as possible within the watershed o Current locations the same as the catch basin locations o The possibility of including smaller, decentralized basins higher in the watershed will be explored, however, the nature of the available data and the model running at subwatershed outlets may preclude detailed modeling and analysis of this type o Efficiencies will be run as a range and will be backed up by literature reviews
TE 10	Capture and Treat First Flush	Route storm water (may require pumping) from Buffalo Gulch and MSD catch basins to HCC or the Berkeley Pit. Includes reducing pumping rates of West Camp to provide additional capacity to BTL.	**(1) Assumptions** ● MSD detention basin will be related to MSD-3A. ● BG detention basin located at base of drainage and will be related to BG-01. **(2) Approach** ● First flush basins sized to capture: ● 5% of 10-year storm for BG (0.85 acre-feet) ● 10% of 10-year storm for MSD (3.8 acre-feet)	**(1) Assumptions:** ● First Flush basin starts empty **(2) Efficiency** ● **First flush To BTL:** ● For TI, 100% of first flush flow & load removed from the 5 year/24 hour storm flow (dissolved and TR) ● Treating storm water at BTL effluent would likely affect the effectiveness of the BTL and will be further discussed in Tech Memo 3. ● **Remainder to SBC:** Assume 0% efficiency for remainder of storm flow **(3) Application:** ● Utilize 2013/2014 ISCO and associated flow data as follows: ● For each storm, determine portion of hydrograph diverted to BTL and passed to SBC and remove portion that would be diverted to BTL from the hydrograph ● ~~For portion of hydrograph passed to SBC, the water quality would be defined by utilizing associated COC concentrations to generate a pdf with first flush concentrations removed from the dataset. Additional detail on applying the pdf will be provided in Tech Memo 3.~~ ● An analysis on the water quality captured by first flush basins will be provided in Tech Memo 3.
TE 11	MSD to Berkeley Pit	Capture storm water in MSD corridor and route to Berkeley Pit.	**CDM Smith will modify HydroCAD model as necessary.**	o All storm water routed to the Berkeley Pit will be assumed to have 100% removal efficiency in the model o The location of the diversion will be the key factor. o The location (based on elevations) of the point at which storm water can be gravity drained to the Pit is required. o Additional analyses will also be performed to determine the possible location of a pump vault and storage area, which may allow more capture of water than through the gravity system. o Model will be run multiple times, assuming different locations for the diversion to the Pit
TE 12	Storm water maintenance program	Existing program to include entire BPSOU storm water system.	**EPA/CDM Indicates no changes to HydroCAD**	o An efficiency range of 1-6% will be used based on CDM Smith's 2/3/15 presentation o May be modeled with various efficiencies to reflect varied levels of maintenance and/or defined maintenance o Literature information for this element will be consulted. It is expected that the overall efficiency of this TE will be relatively low
TE 13	HDD Filters	This TE will include installation of "filters" at the downstream end of the HDD's	**(1) Assumptions** ● Sized to treat 25% of the annual average storm water runoff volume. ● Banks of filters set up downstream of HDs ● Vaults contain multiple filters ● Each filter treats approximately 7.5 gpm ● BG Garfield treats 800 gpm ● Texas Avenue treats 800 gpm ● Anaconda Road HD treats 400 gpm ● Warren Avenue HD treats 400 gpm ● Potential Front Street HD (TE4) treats ~400 gpm ● **Total treated rate: 2,800 gpm** **(2) Approach** ● No changes to the HydroCAD model ● Performed in @Risk	**(1) Assumptions:** ● Evaluate TR efficiency using Contech MetalsRx or CSF leaf media filters based on TR. **(2) Efficiency** **(A) Filter Efficiency:** ● 2014 expanded analysis data sent to Contech to determine: ● % TSS removal by gradation; and ● Overall filter TSS capacity ● General performance of storm filter devices given the site data; and ● Comparable product literature ● 2014 expanded analysis % TSS removal combined with 2014 metals gradation to determine metals removal efficiency **(B) Occluded Filter Conditions:** ● Overall filter TSS capacity utilized to determine if filters would occlude with 5-year/24 hour storm sediment load ● If filter occlusion likely, would incorporate into overall efficiency. **(3) Application:** ● A range of efficiencies will be applied. ● If the filters occlude the efficiency is 0%. ● Additional detail on how this TE would be modeled will be provided in TM3.
TE 14	TBD	Various combinations of a variety of BMP's. Will not be the same as 2010 combinations due to changes in infrastructure and other issues.		
TE 15	TBD	Various combinations of a variety of BMP's. Will not be the same as 2010 combinations due to changes in infrastructure and other issues.		

Notes:

Technical elements 1 through 8 were included in the 2010 TI report

Technical elements 9 through 15 are added

TBD = To be determined

Table 2. Detention Basin Analytical Settling Calculation Estimates

Analyte	Conceptual BG Basin TR Removal Efficiency			Conceptual MSD Basin TR Removal Efficiency		
TR	*6/16/14 Sample*	*8/12/14 Sample*	*Average*	*6/16/14 Sample*	*8/12/14 Sample*	*Average*
Cu	49.2%	52.3%	50.8%	6.7%	70.0%	38.3%
Ag	54.1%	48.9%	51.5%	34.7%	77.9%	56.3%

Table 3. Detention Basin Empirical Settling Calculation Estimates

Analyte	Conceptual BG Basin TR Removal Efficiency			Conceptual MSD Basin TR Removal Efficiency		
TR	*6/16/14 Sample*	*8/12/14 Sample*	*Average*	*6/16/14 Sample*	*8/12/14 Sample*	*Average*
Cu	28.9%	27.8%	28.4%	5.5%	61.1%	33.3%
Ag	48.2%	26.8%	37.5%	27.0%	67.8%	47.4%

Table 4. TE 4 Detention/Retention Literature Removal Efficiencies

Literature Source	BMP Type	TR Cu or Metal Removal Efficiency Percentage
EPA Preliminary Data Summary	Detention Basin	15 - 45
	Retention Basin	50 - 80
National Pollutant Removal Performance Database	Dry Pond	29 (range 10 - 73)
	Wet Pond	57 (range 1 - 95)
UNH[1] Stormwater Center	Retention	68 (TSS), 68 (Zn)

1. University of New Hampshire.

Table 5. TE4 Detention/Retention Basin Efficiency Summary

Source	BMP Types	Cu or Metal Removal Efficiency Percentage
Analytical Settling Calculations	Detention Basin	7 - 78
Empirical Settling Calculations	Detention Basin	5 - 68
National Literature Values	Detention/Retention Basins	1 - 95
CB-8 2004 Monitoring Data	Retention/Infiltration Basin	74 - 97
TI Recommended Range	Detention/Retention Basins	5 - 70

Table 6. TE6 HD Efficiency Summary

Source	BMP Types	Cu or Metal Removal Efficiency Percentage
Field Data	HD	0-39*
Analytical Literature Calculations	HD	36 – 47
TI Recommended Range	HD	0 - 47

*The field data range from -41 to +39%, not assuming negative efficiency, so 0% has been used as a low end.

Table 7. TE10 Evaluation of First Flush Significance at MSD-3A using 2013 and 2014 Sampling Data

Storm Date	Cumulative Volume/Total Volume (V)	Cumulative Mass/Total Mass (V_{80})
May 23, 2013	30%	37%
June 3, 2013	30%	32%
June 12, 2013	30%	32%
July 17, 2013	30%	32%
August 2, 2013	30%	42%
August 27, 2013	30%	24%
September 14, 2013	30%	40%
September 18, 2013	30%	18%
September 25, 2013	30%	19%
September 26, 2013	30%	41%
September 30, 2013	30%	8%
April 18, 2014	30%	29%
April 26, 2014	30%	31%
May 19, 2014	30%	27%
June 16, 2014	30%	29%
June 17, 2014	30%	29%
June 21, 2014	30%	49%
June 25, 2014	30%	35%
June 26, 2014	30%	34%
	Minimum	8%
	Maximum	49%
	Average	31%
	2 Standard Deviations	19%
	Lower Threshold (95% confidence)	12%
	Upper Threshold (95% confidence)	50%

Table 8. TE10 Evaluation of First Flush Significance at BG-01 using 2013 and 2014 Sampling Data

Date	Cumulative Volume/Total Volume (V)	Cumulative Mass/Total Mass (V_{80})
June 12, 2013	30%	37%
June 30, 2013	30%	37%
July 6, 2013	30%	54%
July 17, 2013	30%	45%
August 2, 2013	30%	40%
August 23, 2013	30%	51%
August 27, 2013	30%	42%
August 29, 2013	30%	33%
September 4, 2013	30%	34%
September 8, 2013	30%	38%
September 14, 2013	30%	30%
September 17, 2013	30%	38%
September 25, 2013	30%	34%
September 26, 2013	30%	40%
April 18, 2014	30%	-2%
April 25, 2014	30%	-1%
May 18, 2014	30%	20%
June 13, 2014	30%	17%
June 20, 2014	30%	26%
June 24, 2014	30%	26%
June 25, 2014	30%	26%
	Minimum	-2%
	Maximum	54%
	Average	33%
D	**2 Standard Deviations**	31%
	Lower Threshold (95% Confidence)	2%
	Upper Threshold (95% Confidence)	63%

Table 9. TE13 Sub-Drainage Treatment Flow Rate and StormFilter Cartridge Requirements

Drainage	Treatment Flow Rate (gpm)	Contech StormFilter Cartridges (7.5 gpm each)
Anaconda Road (AR-MH-1)	400	54
Warren Avenue (WA-MH-1)	400	54
Texas Avenue (TX-MH-1)	800	107
Buffalo Gulch (BG-CLV-01)	800	107
Front Street[1] (BG-CH-B3)[2]	400	54

1. The Front Street location represents a proposed condition.
2. Data from BG-MH-B1 was unavailable for the expanded analysis storm events, therefore data from BG-CH-B3, which was available, is assumed to be representative of Front Street drainage conditions.

Table 10. TE13 Contech StormFilter MetalRx Occlusion Estimates for Butte Hill Sub-Drainages

Location	Event	TSS, mg/L	Pounds Sediment per Gallon Influent	18" Cartridges, 1 gpm/ft^2			
				Time to Occlusion (min)	Time to Occlusion (hours)	Time to Occlusion (days)	Average by Drainage (days)
EX-AR-MH-1	6/16/14 11:28	43	0.00036	13543	225.7	9.4	
EX-AR-MH-1	7/23/14 18:25	196	0.00164	2971	49.5	2.1	4.2
EX-AR-MH-1	8/12/14 22:10	366	0.00305	1591	26.5	1.1	
EX-WA-HD-1	6/16/14 13:51	160	0.00134	3628	60.5	2.5	
EX-WA-HD-1	7/23/14 19:11	1586	0.01323	366	6.1	0.3	1.1
EX-WA-HD-1	8/12/14 21:14	938	0.00783	619	10.3	0.4	
EX-TX-HD-1	6/16/14 12:00	1000	0.00834	486	8.1	0.3	0.4
EX-TX-HD-1	8/12/14 21:31	728	0.00607	667	11.1	0.5	
EX-BG-CLV-1	6/17/14 10:06	58	0.00048	9949	165.8	6.9	
EX-BG-CLV-1	7/23/14 18:26	1222	0.01020	472	7.9	0.3	2.7
EX-BG-CLV-1	8/12/14 21:09	416	0.00347	1387	23.1	1.0	
EX-BG-CH-B3	7/15/14 1:29	692	0.00577	841	14.0	0.6	0.6

Table 11. **TE13 HD Filters Efficiency Summary**

Source	BMP Types	TR Cu Removal Efficiency Percentage	DIS Cu Removal Efficiency Percentage
Analytical Performance Calculations	Contech StormFilter	5.0 to 56.8	0.4 to 12.7
National Literature Values	Categorical Filtration Technologies	27 to 57	22 to 33
Contech Literature Values	Retention/Infiltration Basin	30 to 65	up to 39
National Study Values	Manufactured Device "StormFilter"	(-) 1 to 64	(-28) to 32
TI Recommended Range up to time of Occlusion	HD Filters	0 - 65[1]	NA

1. See Table 10 for ranges of efficiencies for each sub-drainage in comparison to the entire 5-year, 24-hour event hydrograph.

Table 12. Summary of Tech Memo 3 Technology Element Efficiencies during the 5-Year, 24-Hour Storm Hydrograph

Technology Element	Flow or Volume Affected by TE (Table 1) (Units Vary)	Flow Removal or Efficiency?	Applied to @Risk 5-year/24-hour Hydrograph	
			Hydrograph Time Step (hours)	COC Removal Efficiency (%)
TE2 – *Diversion of Buffalo Gulch via Belmont Extension*	90% of total flow to Berkeley Pit	Removal	0 to 24	100%
	10% of total flow to SBC	Efficiency	0 to 24	0%
TE4 – *Detention/Retention Basins*	100%	Efficiency	0 to 24	5-70%
TE6 – *Hydrodynamic Devices*	All flow up to 4,350 gpm	Efficiency	0 to 12.2	0-47%
	Bypassed flow (>4,350 gpm)	Efficiency	0 to 12.2	0%
	HD full, all flow bypassed	Efficiency	12.2 to 24	0%
TE10 – *Capture and Treat First Flush Basins*				
Buffalo Gulch	Up to 0.99 acre-feet to BTL	Removal	0 to 9.7	100%[1]
	>0.99 acre-feet to SBC	Efficiency	9.7 to 24	0%
MSD	Up to 3.84 acre-feet to BTL	Removal	0 to 10.8	100%[1]
	>3.84 acre-feet to SBC	Efficiency	10.8 to 24	0%
TE13 – *HD Filters*				
Anaconda Road (AR-MH-1)	400 gpm	Efficiency	0 to 24	0-65%
Warren Avenue (WA-MH-1)	400 gpm	Efficiency	0 to 24	0-65%
Texas Avenue (TX-MH-1)	800 gpm	Efficiency	0 to 10	0-65%[2]
			10 to 24	0%
Buffalo Gulch (BG-CLV-01)	800 gpm	Efficiency	0 to 24	0-65%
Front Street (BG-CH-B3)	400 gpm	Efficiency	0 to 14	0-65%[3]
			14 to 24	0%

1. Assumed to be 100%, see Section 2.4 and Appendix C.
2. The Texas Avenue HD filter device would occlude at an approximate time of 10 hours.
3. The Front Street HD filter device would occlude at an approximate time of 14 hours.

APPENDIX A

TE4 DETENTION/RETENTION BASIN EFFICIENCY CALCULATIONS AND BACKUP DATA

TECHNICAL MEMORANDUM 3: BPSOU TECHNOLOGY ELEMENTS EFFICIENCY EVALUATION

BPSOU
Detention Basin Trap Efficiency Calculation Buffalo Gulch - June 2014 Sample
Primary Discharge: 12x6.5 inch Rectangular Orifice
Reference: Manual 70 Design of Sedimentation Basins, Transportation Research Board, National Research Counci

C =	0.62	Drag Coefficient	OW =	6.5	Orifice Width - Inches
r =		Orifice Radius-ft	OL =	12	Orifice Length - Inches
H =	2.7	Head above invert - ft	Orifice I.E. =	5442.5	Orifice Invert Elevation - Feet
h =	2.43	Head above orifice center - ft	WSEL =	5445.2	Design Water Surface Elevation
Ao =	0.54	Orifice area - sf			
w =	200	Sed Pond Width - ft	A_{p} =	540	X-Sectional Pond Area - SF
L =	1000	Sed Pond Length - ft			
D =	2.7	Sed Pond Depth - ft			
r_{o1} = slug/cf	5.14	Particle Density	Q_{out} =	4.2	Pond Discharge - cfs
r_{o2} = slug/cf	1.94	H_2O Density	Turbulence factor =	1	
μ = slug/cf	2.36E-05	H_2O Viscosity	V =	0.008	Forward Vel - ft/sec
g = ft/s^2	32.2	Gravity Accel	t =	35.7	Detention Time - hrs

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Cu (mg/g)	% of Total P Cu Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	1.5%	98.5%	2.61091	0.01	100.0%	1.5%	12.69%	12.7%
0.063	8.5%	90.0%	0.01036	2.03	100.0%	8.5%	6.77%	6.8%
0.05	14.4%	75.6%	0.00653	3.22	100.0%	14.4%	16.33%	16.3%
0.02	16.2%	59.4%	0.00104	20.11	100.0%	16.2%	18.69%	18.7%
0.002	1.4%	58.0%	0.00001	2011.01	49.7%	0.7%	2.92%	1.5%
0.0005	58.0%	0.0%	0.00000	32176.14	3.1%	1.8%	42.60%	1.3%
						43.1%		57.3%
							TR Cu =	**49.2%**

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Ag	% of Total P Ag Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	1.5%	98.5%	2.61091	0.01	100.0%	1.5%	85.61%	85.6%
0.063	8.5%	90.0%	0.01036	2.03	100.0%	8.5%	0.47%	0.5%
0.05	14.4%	75.6%	0.00653	3.22	100.0%	14.4%	1.56%	1.6%
0.02	16.2%	59.4%	0.00104	20.11	100.0%	16.2%	1.84%	1.8%
0.002	1.4%	58.0%	0.00001	2011.01	49.7%	0.7%	0.63%	0.3%
0.0005	58.0%	0.0%	0.00000	32176.14	3.1%	1.8%	9.90%	0.3%
						43.1%		90.1%
							TR Ag =	**54.1%**

BPSOU
Detention Basin Trap Efficiency Calculation Buffalo Gulch - August 2014 Sample
Primary Discharge: 12x6.5 inch Rectangular Orifice
Reference: Manual 70 Design of Sedimentation Basins, Transportation Research Board, National Research Counci

C =	0.62	Drag Coefficient	OW =	6.5	Orifice Width - Inches
r =		Orifice Radius-ft	OL =	12	Orifice Length - Inches
H =	2.7	Head above invert - ft	Orifice I.E. =	5442.5	Orifice Invert Elevation - Feet
h =	2.43	Head above orifice center - ft	WSEL =	5445.2	Design Water Surface Elevation
Ao =	0.54	Orifice area - sf			
w =	200	Sed Pond Width - ft	A_{p} =	540	X-Sectional Pond Area - SF
L =	1000	Sed Pond Length - ft			
D =	2.7	Sed Pond Depth - ft			
r_{o1} = slug/cf	5.14	Particle Density	Q_{out} =	4.2	Pond Discharge - cfs
r_{o2} = slug/cf	1.94	H_2O Density	Turbulence factor =	1	
μ = slug/cf	2.36E-05	H_2O Viscosity	V =	0.008	Forward Vel - ft/sec
g = ft/s^2	32.2	Gravity Accel	t =	35.7	Detention Time - hrs

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Cu (mg/g)	% of Total P Cu Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	1.1%	98.9%	2.61091	0.01	100.0%	1.1%	0.82%	0.8%
0.063	28.4%	70.4%	0.01036	2.03	100.0%	28.4%	14.36%	14.4%
0.05	6.5%	64.0%	0.00653	3.22	100.0%	6.5%	5.91%	5.9%
0.02	12.6%	51.3%	0.00104	20.11	100.0%	12.6%	11.30%	11.3%
0.002	43.6%	7.7%	0.00001	2011.01	49.7%	21.7%	49.89%	24.8%
0.0005	7.7%	0.0%	0.00000	32176.14	3.1%	0.2%	17.73%	0.6%
						70.6%		57.7%
							TR Cu =	**52.3%**

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Ag	% of Total P Ag Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	1.1%	98.9%	2.61091	0.01	100.0%	1.1%	0.78%	0.8%
0.063	28.4%	70.4%	0.01036	2.03	100.0%	28.4%	14.15%	14.2%
0.05	6.5%	64.0%	0.00653	3.22	100.0%	6.5%	6.05%	6.0%
0.02	12.6%	51.3%	0.00104	20.11	100.0%	12.6%	9.26%	9.3%
0.002	43.6%	7.7%	0.00001	2011.01	49.7%	21.7%	49.89%	24.8%
0.0005	7.7%	0.0%	0.00000	32176.14	3.1%	0.2%	19.86%	0.6%
						70.6%		55.7%
							TR Ag =	**48.9%**

BPSOU
Detention Basin Trap Efficiency Calculation MSD - June 2014 Sample
Primary Discharge: 18x8.3 inch Rectangular Orifice
Reference: Manual 70 Design of Sedimentation Basins, Transportation Research Board, National Research Coun

C =	0.62	Drag Coefficient	OW =	8.3	Orifice Width - Inches
r =		Orifice Radius-ft	OL =	18	Orifice Length - Inches
H =	2.65	Head above invert - ft	Orifice I.E. =	5449.5	Orifice Invert Elevation - Feet
h =	2.30	Head above orifice center - ft	WSEL =	5452.15	Design Water Surface Elevatio
Ao =	1.04	Orifice area - sf			
w =	650	Sed Pond Width - ft	A_{p} =	1722.5	X-Sectional Pond Area - SF
L =	650	Sed Pond Length - ft			
D =	2.65	Sed Pond Depth - ft			
r_{o1} = slug/cf	5.14	Particle Density	Q_{out} =	7.8	Pond Discharge - cfs
r_{o2} = slug/cf	1.94	H_2O Density	Turbulence factor =	1	
μ = slug/cf	2.36E-05	H_2O Viscosity	V =	0.005	Forward Vel - ft/sec
g = ft/s^2	32.2	Gravity Accel	t =	39.7	Detention Time - hrs

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Cu	% of Total P Cu Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	0.9%	99.1%	2.61091	0.00	100.0%	0.9%	5.04%	5.04%
0.063	2.3%	96.7%	0.01036	1.16	100.0%	2.3%	8.74%	8.74%
0.05	3.3%	93.5%	0.00653	1.85	100.0%	3.3%	11.55%	11.55%
0.02	1.3%	92.2%	0.00104	11.54	100.0%	1.3%	5.17%	5.17%
0.002	1.5%	90.6%	0.00001	1154.29	56.3%	0.9%	4.93%	2.78%
0.0005	90.6%	0.0%	0.00000	18468.64	3.5%	3.2%	64.57%	2.27%
						11.9%		35.5%
							TR Cu =	**6.7%**

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Ag	% of Total P Ag Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	0.9%	99.1%	2.61091	0.00	100.0%	0.9%	32.20%	32.20%
0.063	2.3%	96.7%	0.01036	1.16	100.0%	2.3%	3.48%	3.48%
0.05	3.3%	93.5%	0.00653	1.85	100.0%	3.3%	13.35%	13.35%
0.02	1.3%	92.2%	0.00104	11.54	100.0%	1.3%	5.28%	5.28%
0.002	1.5%	90.6%	0.00001	1154.29	56.3%	0.9%	3.47%	1.96%
0.0005	90.6%	0.0%	0.00000	18468.64	3.5%	3.2%	42.22%	1.49%
						11.9%		57.8%
							TR Ag =	**34.7%**

BPSOU
Detention Basin Trap Efficiency Calculation MSD - August 2014 Sample
Primary Discharge: 18x8.3 inch Rectangular Orifice
Reference: Manual 70 Design of Sedimentation Basins, Transportation Research Board, National Research Coun

C =	0.62	Drag Coefficient	OW =	8.3	Orifice Width - Inches
r =		Orifice Radius-ft	OL =	18	Orifice Length - Inches
H =	2.65	Head above invert - ft	Orifice I.E. =	5449.5	Orifice Invert Elevation - Feet
h =	2.30	Head above orifice center - ft	WSEL =	5452.15	Design Water Surface Elevatio
Ao =	1.04	Orifice area - sf			
w =	650	Sed Pond Width - ft	A_{p} =	1722.5	X-Sectional Pond Area - SF
L =	650	Sed Pond Length - ft			
D =	2.65	Sed Pond Depth - ft			
r_{o1} = slug/cf	5.14	Particle Density	Q_{out} =	7.8	Pond Discharge - cfs
r_{o2} = slug/cf	1.94	H_2O Density	Turbulence factor =	1	
μ = slug/cf	2.36E-05	H_2O Viscosity	V =	0.005	Forward Vel - ft/sec
g = ft/s^2	32.2	Gravity Accel	t =	39.7	Detention Time - hrs

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Cu	% of Total P Cu Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	10.2%	89.8%	2.61091	0.00	100.0%	10.2%	9.46%	9.46%
0.063	82.8%	7.0%	0.01036	1.16	100.0%	82.8%	83.76%	83.76%
0.05	1.9%	5.1%	0.00653	1.85	100.0%	1.9%	2.27%	2.27%
0.02	1.5%	3.6%	0.00104	11.54	100.0%	1.5%	1.13%	1.13%
0.002	1.8%	1.8%	0.00001	1154.29	56.3%	1.0%	1.69%	0.95%
0.0005	1.8%	0.0%	0.00000	18468.64	3.5%	0.1%	1.69%	0.06%
						97.5%		97.6%
							TR Cu =	**70.0%**

Particle Dia (mm)	% In Category	% Finer	Settling Vel (ft/sec)	Length to Settle (ft)	% Settling	% of Total Settling	% of Total Particulate Ag	% of Total P Ag Settling
2	0.0%	100.0%	10.44363	0.00	100.0%	0.0%		
1	10.2%	89.8%	2.61091	0.00	100.0%	10.2%	9.88%	9.88%
0.063	82.8%	7.0%	0.01036	1.16	100.0%	82.8%	80.91%	80.91%
0.05	1.9%	5.1%	0.00653	1.85	100.0%	1.9%	2.86%	2.86%
0.02	1.5%	3.6%	0.00104	11.54	100.0%	1.5%	0.96%	0.96%
0.002	1.8%	1.8%	0.00001	1154.29	56.3%	1.0%	2.32%	1.31%
0.0005	1.8%	0.0%	0.00000	18468.64	3.5%	0.1%	3.07%	0.11%
						97.5%		96.0%
							TR Ag =	**77.9%**

24-Hour Detention Time Trap Efficiency (Design of Sedimentation Basins, Transportation Research Board 1980)
Figure 16

Sand = 90%
Silt/Clay = 20%

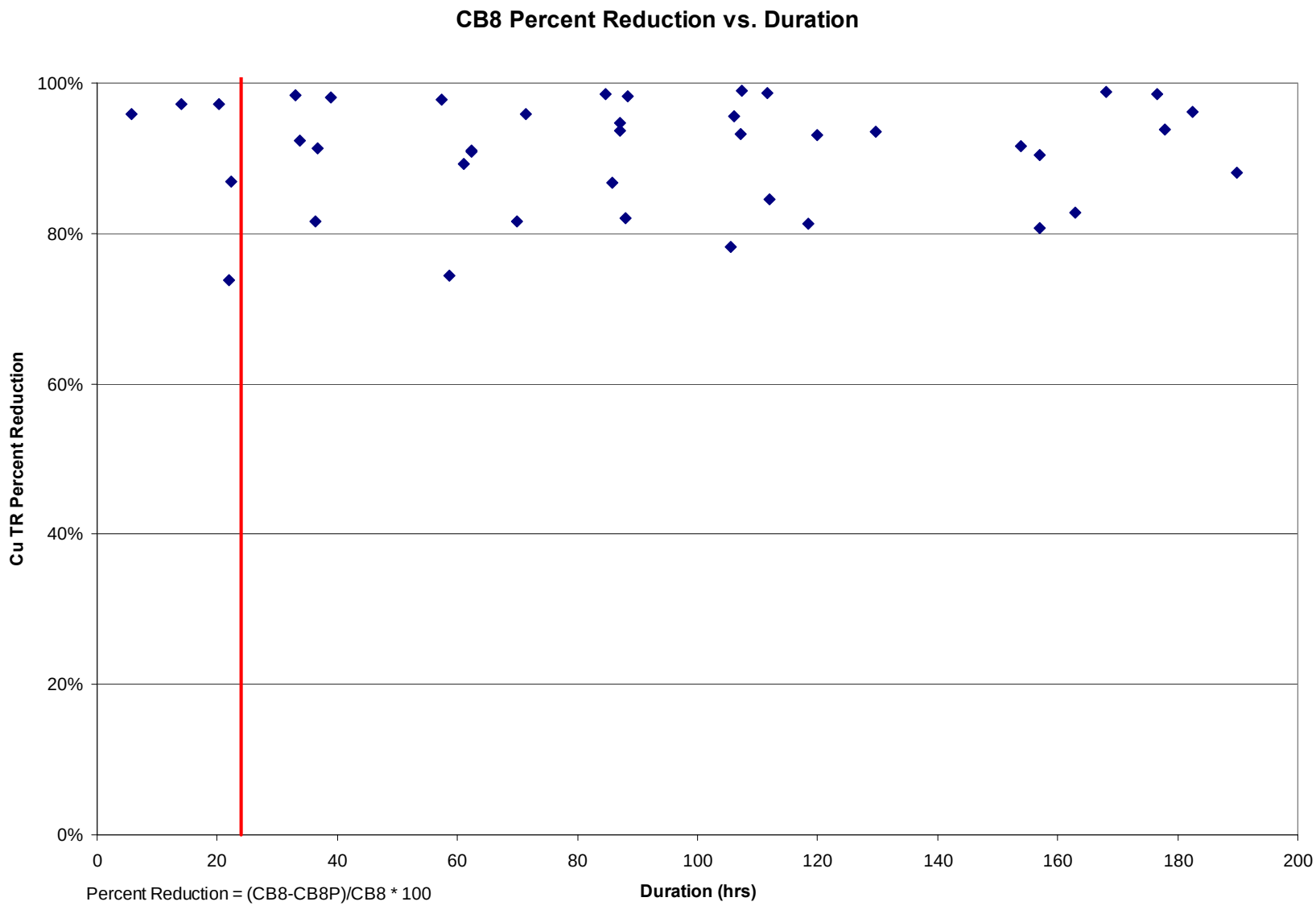
Location	Date	Parameter	Cu/Sediment (mg/Kg)	Sediment per Fraction (g)	Cu per fraction (mg)	% of Total	Particulate Class	% of Particulate Cu by Class	Particulate Cu Trap Efficiency	Total Particulate Cu Trap Efficiency	TR Cu Trap Efficiency[1]
MSD-CLV-3A	6/16/2014	Cu 1-2mm	1400	0.0318	0.04452	5.0%	Med Sand	13.8%	12.4%	29.6%	5.5%
MSD-CLV-3A	6/16/2014	Cu 0.063-1mm	993	0.0777	0.0771561	8.7%	Med/Fine Sand				
MSD-CLV-3A	6/16/2014	Cu 0.05-0.063mm	926	0.1101	0.1019526	11.5%	Silt	86.2%	17.2%		
MSD-CLV-3A	6/16/2014	Cu 0.02-0.05mm	1050	0.0435	0.045675	5.2%	Silt/Clay				
MSD-CLV-3A	6/16/2014	Cu 0.002-0.02mm	837	0.052	0.043524	4.9%	Silt/Clay				
MSD-CLV-3A	6/16/2014	Cu <0.002mm	187	3.049	0.570163	64.6%	Clay				
MSD-CLV-3A	8/12/2014	Cu 1-2mm	735	1.33	0.97755	9.5%	Med Sand	93.2%	83.9%	85.3%	61.1%
MSD-CLV-3A	8/12/2014	Cu 0.063-1mm	798	10.85	8.6583	83.8%	Med/Fine Sand				
MSD-CLV-3A	8/12/2014	Cu 0.05-0.063mm	950	0.2466	0.23427	2.3%	Silt	6.8%	1.4%		
MSD-CLV-3A	8/12/2014	Cu 0.02-0.05mm	577	0.2019	0.1164963	1.1%	Silt/Clay				
MSD-CLV-3A	8/12/2014	Cu 0.002-0.02mm	732	0.2392	0.1750944	1.7%	Silt/Clay				
MSD-CLV-3A	8/12/2014	Cu <0.002mm	750	0.233	0.17475	1.7%	Clay				
BG-CLV-01	6/16/2014	Cu 1-2mm	2020	0.056	0.11312	12.7%	Med Sand	19.5%	17.5%	33.6%	28.9%
BG-CLV-01	6/16/2014	Cu 0.063-1mm	196	0.3078	0.0603288	6.8%	Med/Fine Sand				
BG-CLV-01	6/16/2014	Cu 0.05-0.063mm	278	0.5235	0.145533	16.3%	Silt	80.5%	16.1%		
BG-CLV-01	6/16/2014	Cu 0.02-0.05mm	283	0.5884	0.1665172	18.7%	Silt/Clay				
BG-CLV-01	6/16/2014	Cu 0.002-0.02mm	530	0.0491	0.026023	2.9%	Silt/Clay				
BG-CLV-01	6/16/2014	Cu <0.002mm	180	2.109	0.37962	42.6%	Clay				
BG-CLV-01	8/12/2014	Cu 1-2mm	230	0.367	0.08441	0.8%	Med Sand	15.2%	13.7%	30.6%	27.8%
BG-CLV-01	8/12/2014	Cu 0.063-1mm	162	9.146	1.481652	14.4%	Med/Fine Sand				
BG-CLV-01	8/12/2014	Cu 0.05-0.063mm	293	2.081	0.609733	5.9%	Silt	84.8%	17.0%		
BG-CLV-01	8/12/2014	Cu 0.02-0.05mm	287	4.063	1.166081	11.3%	Silt/Clay				
BG-CLV-01	8/12/2014	Cu 0.002-0.02mm	367	14.03	5.14901	49.9%	Silt/Clay				
BG-CLV-01	8/12/2014	Cu <0.002mm	738	2.48	1.83024	17.7%	Clay				

1 - Assumes TR = Particulate + Dissolved

Site Location	Monitoring Date	Parameter	Value	Units	Particulate Cu	Part./Tr Ratio	Monitoring Date	Parameter	Value	Units	Particulate Cu	Part./Tr Ratio
MSD-CLV-3A	6/16/2014	CuTr	0.0807	mg/L	0.0151	18.7%	8/12/2014	CuTr	0.18	mg/L	0.129	71.7%
MSD-CLV-3A	6/16/2014	CuDis	0.0656	mg/L			8/12/2014	CuDis	0.051	mg/L		
BG-CLV-01	6/16/2014	CuTr	0.0479	mg/L	0.04115	85.9%	8/12/2014	CuTr	0.227	mg/L	0.2058	90.7%
BG-CLV-01	6/16/2014	CuDis	0.00675	mg/L			8/12/2014	CuDis	0.0212	mg/L		

Location	Date	Parameter	Ag/Sediment (mg/Kg)	Sediment per Fraction (g)	Ag per fraction (mg)	% of Total	Particulate Class	% of Particulate Ag by Class	Particulate Ag Trap Efficiency	Total Particulate Ag Trap Efficiency	TR Ag Trap Efficiency[1]
MSD-CLV-3A	6/16/2014	Ag 1-2mm	88.5	0.0318	0.0028143	32.2%	Med Sand	35.7%	32.1%	45.0%	27.0%
MSD-CLV-3A	6/16/2014	Ag 0.063-1mm	3.91	0.0777	0.00030381	3.5%	Med/Fine Sand				
MSD-CLV-3A	6/16/2014	Ag 0.05-0.063mm	10.6	0.1101	0.00116706	13.4%	Silt	64.3%	12.9%		
MSD-CLV-3A	6/16/2014	Ag 0.02-0.05mm	10.6	0.0435	0.0004611	5.3%	Silt/Clay				
MSD-CLV-3A	6/16/2014	Ag 0.002-0.02mm	5.84	0.052	0.00030368	3.5%	Silt/Clay				
MSD-CLV-3A	6/16/2014	Ag <0.002mm	1.21	3.049	0.00368929	42.2%	Clay				
MSD-CLV-3A	8/12/2014	Ag 1-2mm	4.55	1.33	0.0060515	9.9%	Med Sand	90.8%	81.7%	83.6%	67.8%
MSD-CLV-3A	8/12/2014	Ag 0.063-1mm	4.57	10.85	0.0495845	80.9%	Med/Fine Sand				
MSD-CLV-3A	8/12/2014	Ag 0.05-0.063mm	7.11	0.2466	0.00175333	2.9%	Silt	9.2%	1.8%		
MSD-CLV-3A	8/12/2014	Ag 0.02-0.05mm	2.91	0.2019	0.00058753	1.0%	Silt/Clay				
MSD-CLV-3A	8/12/2014	Ag 0.002-0.02mm	5.95	0.2392	0.00142324	2.3%	Silt/Clay				
MSD-CLV-3A	8/12/2014	Ag <0.002mm	8.07	0.233	0.00188031	3.1%	Clay				
BG-CLV-01	6/16/2014	Ag 1-2mm	1150	0.056	0.0644	85.6%	Med Sand	86.1%	77.5%	80.3%	48.2%
BG-CLV-01	6/16/2014	Ag 0.063-1mm	1.15	0.3078	0.00035397	0.5%	Med/Fine Sand				
BG-CLV-01	6/16/2014	Ag 0.05-0.063mm	2.24	0.5235	0.00117264	1.6%	Silt	13.9%	2.8%		
BG-CLV-01	6/16/2014	Ag 0.02-0.05mm	2.35	0.5884	0.00138274	1.8%	Silt/Clay				
BG-CLV-01	6/16/2014	Ag 0.002-0.02mm	9.58	0.0491	0.00047038	0.6%	Silt/Clay				
BG-CLV-01	6/16/2014	Ag <0.002mm	3.53	2.109	0.00744477	9.9%	Clay				
BG-CLV-01	8/12/2014	Ag 1-2mm	1.81	0.367	0.00066427	0.8%	Med Sand	14.9%	13.4%	30.5%	26.8%
BG-CLV-01	8/12/2014	Ag 0.063-1mm	1.31	9.146	0.01198126	14.2%	Med/Fine Sand				
BG-CLV-01	8/12/2014	Ag 0.05-0.063mm	2.46	2.081	0.00511926	6.0%	Silt	85.1%	17.0%		
BG-CLV-01	8/12/2014	Ag 0.02-0.05mm	1.93	4.063	0.00784159	9.3%	Silt/Clay				
BG-CLV-01	8/12/2014	Ag 0.002-0.02mm	3.01	14.03	0.0422303	49.9%	Silt/Clay				
BG-CLV-01	8/12/2014	Ag <0.002mm	6.78	2.48	0.0168144	19.9%	Clay				

	Monitoring Date	Parameter	Value	Units	Particulate	Part./Tr Ratio	Monitoring Date	Parameter	Value	Units	Particulate	Part./Tr Ratio
MSD-CLV-3A	6/16/2014	AgTr	0.0025	mg/L	0.0015	60.0%	8/12/2014	AgTr	0.00106	mg/L	0.00086	81.1%
MSD-CLV-3A	6/16/2014	AgDis	0.001	mg/L			8/12/2014	AgDis	0.0002	mg/L		
BG-CLV-01	6/16/2014	AgTr	0.0025	mg/L	0.0015	60.0%	8/12/2014	AgTr	0.00165	mg/L	0.00145	87.9%
BG-CLV-01	6/16/2014	AgDis	0.001	mg/L			8/12/2014	AgDis	0.0002	mg/L		


CB8 Percent Reduction vs. Duration
Cu TR Percent Reduction
100%
80%
60%
40%
20%
0%
0
20
40
60
80
100
120
140
160
180
200
Duration (hrs)
Percent Reduction = (CB8-CB8P)/CB8 * 100

APPENDIX B

BUFFALO GULCH HYDRODYNAMIC DEVICE CAPTURE EFFICIENCY EVALUATION

TECHNICAL MEMORANDUM 3: BPSOU TECHNOLOGY ELEMENTS EFFICIENCY EVALUATION

Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area Superfund Site

Buffalo Gulch Hydrodynamic Device Capture Efficiency Evaluation

Prepared by: Atlantic Richfield Company

March 2015

June/July 2014 HYDRODYNAMIC DEVICE EFFICIENCY ANALYSIS BUFFALO GULCH BUTTE PRIORITY SOILS OPERABLE UNIT

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1.0 Introduction

Region 8 of the United States Environmental Protection Agency (EPA) issued a Unilateral Administrative Order (UAO) for partial remedial design/remedial action implementation and certain operation and maintenance at the Butte Priority Soils Operable Unit (BPSOU) in 2011. Section 2.4 E. of the UAO requires that the hydrodynamic devices described in the Draft Plan for Third Cycle Best Management Practices (April 2011), and as modified by direction from EPA, be constructed at the following five locations:

- Texas Avenue
- Warren Avenue
- Anaconda Road
- Montana Street
- Buffalo Gulch – Webster Garfield

A six HD location is proposed at Buffalo Gulch – Front and Dakota Street.

These hydrodynamic device (HD) sites are located near the base of the Butte Hill and are located on existing storm water mains up-gradient from the storm water outfalls. The purpose of the hydrodynamic devices at these locations is to capture sediments and associated contaminants of concern (COC's) before the storm water is discharged to the Metro Storm Drain (MSD) or Silver Bow Creek (SBS).

The evaluation of the capture effectiveness of HDs is specific to the Buffalo Gulch – Webster Garfield HD (hereafter referred to as the BG-Webster Garfield HD in 2014 and looks at the efficiency of sediment and metals capture from storm water. The capture effectiveness evaluation results at the Buffalo Gulch – Webster Garfield HD are then applied to the proposed HD at the Buffalo Gulch – Front and Dakota Street HD (hereafter referred to as the BG-Front St. HD)

1.1 Sampling and Analysis Plans

The data used for the evaluation of HD efficiency were collected under two different sampling plans.

At the request of the Environmental Protection Agency (EPA), a Hydrodynamic Sampling and Analysis Plan (SAP) was prepared as an addendum to the BPSOU Interim Surface Water Monitoring Plan (IMP) and implemented in 2013 and 2014 to address sampling collection at the recently completed Buffalo Gulch and Anaconda Road HDs. The primary purpose of the monitoring was to assess the effectiveness of the hydrodynamic devices. Sampling analysis consisted of total suspended sediment (TSS) concentration, total recoverable and dissolved metals concentration (As, Cd, Cu, Pb, and Zn), pH, and mass of sediment for each fraction, and pH of each fraction. The size fractions were < 0.063mm, 0.063-1 mm, 1-2 mm, and > 2 mm; however, no metals analysis was done for these fractions, only the fraction weight. Continuous flow data was also collected at the Buffalo Gulch and Anaconda Road HDs on the inlet side of the HD.

To supplement the Hydrodynamic Sampling and Analysis Plan, an Expanded Analysis Surface Water Monitoring Plan was prepared and submitted to the EPA and Montana Department of Environmental Quality (DEQ) in 2014. The primary purpose of this monitoring was to determine the metal concentrations associated with various suspended sediment size fractions in storm water. The size fractions were < 0.002 mm, 0.002-0.02 mm, 0.02-0.05 mm, 0.05- 0.063mm, 0.063-1 mm, and 1-2 mm. This sampling was conducted at eight different stations within BPSOU, including at points downstream of the Buffalo Gulch and Anaconda Road HDs.

1.2 Sampling and Analysis Data

The 14 sample events at the BG-HD inlet and outlet occurred on 6/1/14 #1, 6/1/14 #2, 6/13/14, 6/15/14, 6/16/14, 6/20/14 #1, 6/20/14 #2, 6/24/14, 6/26/14, 7/14/14, 7/21/14, 7/22/14, 7/23/14, and 8/12/14. These were used because of suitableness of data (i.e. multiple samples during a storm event for both the inlet and outlet to the HD with similar samples time for the inlet and outlet samples). The HD devices are currently being cleaned out on a monthly schedule by BSB. The first cleanout of 2014 was 6/11 and was also cleaned on 7/16, 8/7, and 8/26. There was also a sampling event in 2013, on June 11th, that contained a suitable data set, but there were no other suitable sample sets during that year to attempt to discern a correlation between HD capture efficiency and HD sump sediment depth. Therefore, the 2013 data was not considered in this analysis. Sampling was also conducted in 2013 and 2014 at the Anaconda Road – Butte Brewery HD, however this site had difficulty in collecting samples for the inlet and outlet at the same times, so this data was excluded from the analysis.

There were two sample events where samples were collected for the Expanded Analysis fractioning, which occurred on 6/17/14 and 8/12/14 at AR-MH-1, BG-CLV-01, BG-CH-C1, MSD-3A, WA-HD-1, TX-HD-1, SS-04, and SS-07. For the purposes of this evaluation, samples from SS-04 and SS-07 were not utilized since the suspended sediment collected from these locations would be mixed with sediment coming from the Blacktail Creek basin.

1.3 Evaluation Objective

Fourteen June, July, and August of 2014 wet weather event samples collected at the upstream (influent) and downstream (effluent) location for the Buffalo Gulch – Webster Garfield HD are evaluated as part of this analysis. Expanded Analysis was conducted for two events in June and August of 2014 at a point downstream of the BG-Webster Garfield HD. The following objectives apply to the analysis of this collected data:

1) Based on sample results at the HD inlet and outlet, evaluate the efficiency of the HD at removing sediment and COCs. See Section 2.
2) Apply the Expanded Analysis results to the literature HD capture rate values per fraction to determine the total COC capture rates. See Section 3.
3) Evaluate if Expanded Analysis results applied to literature capture rates values are in the range of the observed sample results at the HD when the HD is clean (i.e. sediment levels are contained within the HD sump). See Section 3.
4) Apply findings from objectives 1-3 to evaluate proposed BG-Front Street HD capture effectiveness. See Section 4.

The Figure 1 – HD Evaluation Flow Chart provides the three main sources of data/evidence to be evaluated: 1) the sample results at the BG-HD, 2) the expanded analysis fraction results, 3) and the literature reviews' sediment fraction size cutoffs for various design flow rate. The four objectives listed above are numbered on flow chart and use the three main sources of data/evidence to complete the objectives.

2.0 HD Inlet and Outlet Samples Capture Rate Evaluation – Field Data Evaluation

2.1 Capture Rate Calculations

HD capture rates are calculated by determining the flow-weighted event mean concentration (EMC) for each storm event, multiplying the EMC by the total flow volume for a storm to determine a total load of a particular COC for a particular storm. The total storm load is calculated for both the inlet and outlet of the HD and a resulting capture rate calculated.

The EMC was calculated for the representative wet weather events for each COC. Prior to analysis constituent concentrations were log-transformed due to- the log-normal distribution of the data. The EMC was calculated using the following equation:

$$EMC = \frac{\sum_{i=1}^{n} C_i \times F_i}{\sum_{i=1}^{n} F_i}$$

Where EMC= flow-weight mean for a particular storm;

C_i = individual runoff sample concentration of the *i*th sample

F_i = instantaneous flow at the time of *i*th sample

n = number of samples per event.

2.2 Sediment Volume Evaluation

In order to ascertain the capture rate of the HD device, the sediment levels as compared to the HD sediment sump depth need to be evaluated so it can be determined if there is a difference for capture rates between a "clean" and a "full" HD device. The schematic shown in Figure 2, provides a view of the sump, inner, and outer chambers of the HD. The solids storage volume within the HD device is approximately 250 CF (or 500 CF for the double HD device at the BG-Webster Garfield HD) with the storage sump of the HD with a depth of 3'-2½". Sediment accumulation above the 3'-2½" deep sump is possible above the sump in the inner chamber (inside the treatment screen) as well is in the outer chamber.

The methodology employed to estimate the volume of sediment accumulated during rainfall events utilizes the continuous flow and velocity data and the EMC, a flow weighted average of concentration, for each COC and TSS for all the sampling events. The calculated TSS EMC difference between the inlet and outlet of the HD is assumed to be 8,600 mg/L. A threshold velocity of 3.7 ft/s was assumed to be required to entrain the sediment. For any velocities above 3.7 ft/s, it is assumed that sediment upstream of the HD is entrained and flows into the HD with TSS averaging (flow weighted) 8,600 mg/L more going into the HD than going out. The sediment dry unit weight is estimated to be 102 lb/CF. For those cases where velocity is over 3.7 ft/s, the delta EMC of 8,600 mg/L is multiplied by the average measured flow rate over a time period which is multiplied by the time period which is then divided by the assumed dry unit weight of the sediment which is multiplied by a unit conversion, to produce an estimated volume accumulated during the time period. These volumes are added up for the duration of a flow event.

Figure 3 shows the cumulative sediment built up in the HDs with 6/11/14 and 7/16/14 cleanout dates. One hundred percent cleanout is assumed for both cleanouts dates. This figure shows that after the 6/11/14 cleanout, the HD sump would have exceeded its capacity before the 6/20/14 event, and then again after the 7/16/14 cleanout and before the 8/12/14 event.

These predicted results are compared to four observed sediment levels measured taken on 6/25/14, 7/8/14, 7/23/14, and 9/12/14. The measured results compared to the calculated sediment volumes are shown in Table 1. Also included as a check for the calculated values is the above analysis completed with a threshold velocity of zero instead of 3.7 ft/s. This check assumes that whenever water is flowing into the HD that there is an 8,600 mg/L difference between the inlet and outlet TSS concentrations and provides an upper limit for the calculated value.

Table 1 demonstrates that the calculated values for the 6/25/14 and 7/8/14 dates are fairly close to the measured values (within 23% and 46% respectively). As the HD fills up with sediment the propensity of entrained sediment to res-suspend increases. This is evidenced by certain evens showing negative efficiencies. Therefore, predicted sediment volumes may be an overestimate and thus the calculated values as compared to the measured values can be considered valid. The 7/23/14 and 9/12/14 measurements are much higher than the calculated values (261% and 523% higher respectively). Given the low TSS capture performance of the HD after the 7/16/14 cleanout during the 7/21/14, 7/22/14, and 7/23/14 sample events as shown in Section 2.3, it is speculated that the HD was not completely cleaned out on 7/16/14. The 7/23/14 sediment measurement as compared to the calculated sediment volume range appears to confirm this speculation. Also, given that the measured sediment volume on 7/23/14 and 9/12/14 is much greater than the calculated sediment volume range, it also appears that the HD was not completely cleaned out on 7/16/14 and8/26/14. These conclusions are tentative given the limited sediment measurement data available, however, given the variability of the actual sediment measurements, the calculated values assuming a velocity threshold of 3.7 ft/s shown in Figure 3 are assumed for the Section 2 analysis.

2.3 TSS Capture Analysis

The Total Suspended Solids (TSS) capture efficiencies were evaluated for 14 events in June, July, and August of 2014. The difference between the inflow and outflow loads were used to determine the capture efficiency for a given wet weather event. The Figure 4 shows the rate of capture for TSS and fractions thereof. The fractions evaluated are > 2 mm, 1-2 mm, 0.25-1 mm, 0.063-0.25 mm, and < 0.063 mm. Figure 4 graphs the efficiency rating for each event for TSS and each fraction thereof, while Table 2 shows the summary of the capture rate values. Tables 3 through 8 show the calculations that were made for each fraction.

Figures 4 also graphs the average storm flow rate during the sampling event, which is directly measured by an ISCO area-velocity flow meter at the HD inlet, as well as the sump % full that was calculated in Section 2.1.

Figure 4 shows that the larger grain fractions (greater than 0.25 mm, medium sand and larger) are fairly consistent in their capture rates, except for a drop in capture efficiency on the 6/26/14 sampling event which was relatively full of sediment at the time and had a higher flow rate compared to the other events. For the smaller grain fractions (less than 0.25 mm, fine sand and smaller) capture rates are highly variable, but appear improve with available sump capacity. After the 6/11 cleaning the capture efficiency for the smaller fraction increases to almost zero for the next two events and then begins to drop off when the HD fills up with sediment. Similarly, after the 7/16 cleaning, the capture efficiency for the smaller fraction increases from highly negative to almost zero; however, the overall TSS capture rates are relatively low (ranging from 21% to 38%) for the three storms after the 7/16/14 cleaning when the HD is predicted to be relatively clean (see Table 1). It is speculated that the HD was not fully cleaned in the 7/16/14 cleanout because of the low TSS capture rates directly after the cleanout. The evaluation in Section 2.1 – Sediment Volume Evaluation appears to confirm this.

It should be noted that the negative efficiency calculated values for the smaller grain fractions, does not mean that the HD is producing these fine grain sediments. Likely, at the end of a storm larger grain sediment is entrained in the center column of the upper chamber of the HD unit and the finer grains will pass through the screen to the outer column as the velocity and the turbulence in the chamber decrease. However, in the first flush of the next storm, this fine grain material is re-suspended and flushed out of the outer chamber to the outlet of the HD. The samplers are set to capture the first flush of the storm events which corresponds to the time period when the fine material from prior storm events is re-suspended and discharged from the HD unit during this time period, thus explaining why a load increase is observed in the sampling of the HD unit. This sample bias effect will be exacerbated as the sediment storage sump in the HD fills with sediment and the possible condition of sediment levels being above the sump. This provides an explanation of why the finer grain fractions decrease in capture rates as the HD storage sump becomes full, but the larger grain fraction capture rate largely remain unchanged.

It should also be noted, that due to the inherent sampling setup with sample tubing being located at the bottom of the circular inlet and outlet pipes that there may be a sample bias. With inlet velocities likely greater than outlet velocities due to energy dissipating effects of the HD, there is a good chance that the smaller grain fraction sediment is well mixed in the inlet flow while the larger grain fractions are likely nearer the bottom of the flow depths and nearer to the sample tubing. While this theoretical sample bias may be an actual condition it is outside the scope of this evaluation to quantify.

2.4 COC Capture Analysis

Five Contaminants of Concern (COC) - copper, zinc, arsenic, cadmium, and lead – were evaluated to determine capture efficiencies for the 14 events in June, July, and August of 2014. The difference between the inflow and outflow equivalent loads for each COC were used to determine the capture efficiency for a given wet weather event. Figure 5 graphs the efficiency rating for each event for TSS and each fraction thereof, while Table 2 shows the summary of the capture rate values. Tables 9-13 show the calculations that were made for each COC.

Similar to the small fraction of TSS, in general, we see that the capture efficiency improve after the 6/11/14 and 7/16/14 cleanings. Directly after the 6/11/14 cleaning, the 6/13/14 sample event shows very low capture rates (in fact negative for all COCs), but this storm event was a very low flow event and only had two samples on the inlet and outlet and thus may have been especially susceptible to sample bias. The 6/15/14 sample event then shows a copper capture rate of 39% after the cleanout, but then getting worse as the HD becomes fuller with sediment, with the exception of the 6/20/14 #1 event which actually improves to a 58% capture rate for copper. Comparing the 6/15/14 event to the 6/20/14 #1 event, the HD is more full of sediment for the 6/20 event, but the flow is less than half as much, which may explain the increase in efficiency. Comparing the 6/20/14 #1 storm to the 6/20/14 #2 event, the HD is fuller and the flows are much higher for the #2 event than the #1 event, which likely explains the decrease in efficiency between the two storms. Before the 7/16/14 cleanout, the HD is calculated to be over 300% full and has the low copper capture rate of -156% on the 7/14/14 sample event, but then improves to -7% after the HD is cleaned out for the 7/21/14 sample event when it is calculated that the HD is 5% full of sediment and then improves to 8% for the 7/22/14 sample event when it is calculated that the HD is 22% full of sediment. The difference between the 7/21/14 and 7/22/14 sample events when the HD is relatively clean and flows are relatively low for both events, could be explained by sample variability. For the two remaining sample events on 7/23/14 and 8/12/14 the capture rates decrease as the HD fills with sediment.

Table 2 illustrates the general patterns of capture rates as shown in Figure 5, and the variability between sample events. It should be noted that all sample events were under the 50 cfs design treatment capacity

of the double HD unit in Buffalo Gulch, with the peak flow of all the samples occurring during the 7/23/14 event with a flow of 31.25 cfs (or 62.5% of the design flow rate). As such, it appears that most of the variability in the capture rates shown in Table 2 are due to sediment levels being above the recommended cleanout level.

2.5 Capture Rate Summary

When a screening criteria is applied to the Table 2 data set and only those sample events that have three or more samples that are sampled near the same time for the inlet and outlet samples and then comparing the sample events where the HD is calculated to be less than 100% full to those sample events that are calculated to be more than 100% full reveals a tighter data set where some ranges can be expressed. Table 14 shows those results.

For copper capture rates, a range of -41% to 39% with an average of 1% is calculated for when HD sediment levels are below their recommended cleanout depth. Lead results in the lowest capture rate of -46% and cadmium has the highest capture rate of 76%. Comparing the less than 100% full to the more than 100% full results, predictably the capture rates decrease as the HDs are fuller. The standard deviation in the less than 100% full scenario is also much less than the more than 100% full scenario (on average more than twice the standard deviation from the "clean" to the "full" scenarios), revealing that when the HD is clean results are more consistent. Expectedly, when the HD is fuller with sediment than recommended, the results vary greatly as hydraulic conditions are modified with changing sediment conditions.

For suspended sediment, the same conclusions that were drawn from Figure 1 can be drawn that even when HD sediment levels are below the recommended cleanout depth, the finer grain fractions have very poor capture rates, while the larger grain fractions have better capture efficiencies. The Total Suspended Sediment (TSS) Capture Rates range from 21% to 96% for when the HD is less than 100% full of sediment, which is in line with the manufacturer's estimated capture rate of 80%. Comparing the less than 100% full to the more than 100% full results, shows that as the HDs become more full with sediment the finer grain fractions decrease in capture efficiency, but curiously increase in capture efficiency for the larger grain sediments. This unexpected result could be explained by the variability in sample results, the potential for sample bias, and/or the limited number of samples.

Evaluating the HD based on the field samples taken at the inlet and outlet of the BG-Webster Garfield HD reveals that TSS capture rates range from 21% to 96% and average 47%, copper capture rates range from -41% to 39% and average 1%, zinc capture rates range from -35% to 72% and average 11%, cadmium ranges from -16% to 76% and averages 14%, and lead ranges from -46% to 69% and averages 7%. These values are compared to the capture effectiveness evaluation method used in Section 3 and a recommended capture effectiveness range is presented in Table 15.

3.0 Expanded Analysis Fraction and Literature Capture Rates Evaluation

3.1 Expanded Analysis Results Summary

Two sample events where samples were collected for the Expanded Analysis fractioning occurring on 6/17/14 and 8/12/14 at AR-MH-1, BG-CLV-01, BG-CH-C1, MSD-3A, WA-HD-1, TX-HD-1, SS-04, and SS-07. For the purposes of this evaluation, samples from SS-04 and SS-07 were not utilized since the suspended sediment collected from these locations would be mixed with sediment coming from the Blacktail Creek basin.

3.1.1 Buffalo Gulch Results

Table 15 shows the sediment arsenic, cadmium, copper, lead, and zinc total mass per fraction for the < 0.002 mm, 0.002-0.02 mm, 0.02-0.05 mm, 0.05- 0.063mm, 0.063-1 mm, and 1-2 mm fractions for both the 6/17/14 and 8/12/14 sample events at the BG-CLV-01 sample location (the bottom of the Buffalo Gulch drainage and downstream of the BG-Webster Garfield HD). Figures 6 and 7 show these results graphically.

The 8/12/14 sample event shows much higher COC mass on the finer grain fractions, but as can be seen for the 6/17/14 sample event the 1-2 mm fraction has a fairly high concentration of arsenic, cadmium, and zinc, especially when compared to the 8/12/14 results. A look at the lab report reveals that for the 6/17/14 sample event the sample mass for the 1-2 mm was very low and thus the method detection limit (MDL) was very high for arsenic, cadmium, and zinc and the reported values were at the MDL for these COCs. As such, the 1-2 mm fraction was skewed high for these COCs. The analysis below in Section 3.3 will apply both the 6/17/14 and 8/12/14 results to determine a range of efficiencies.

3.1.2 All Butte Hill Drainage Results

Given the limited Expanded Analysis data set for the Buffalo Gulch drainage and the low sediment mass and resulting high MDL for the 1-2 mm fraction for one of the sample events for the Buffalo Gulch Expanded Analysis sample (see Table 16), a second evaluation of all Expanded Analysis sites on the Butte hill (i.e. all stations, except SS-04 and SS-07) was conducted. The stations used for this purpose are AR-MH-1, BG-CLV-01, BG-CH-C1, MSD-3A, WA-HD-1, and TX-HD-1. An average of all the sample results for each location was taken. In this evaluation, whenever a fraction sample result was at the MDL value (which only occurred at some sample stations and for some fractions), an average for all stations per fraction was calculated using the MDL value, half the MDL value, and 0. In this evaluation, the < 0.002 mm, 0.002-0.02 mm, 0.02-0.05 mm, 0.05- 0.063mm fractions were grouped together into a single < 0.063 mm fraction to coincide with the BG-Webster Garfield inlet and outlet sample results.

Table 16 provides a summary of % of COC mass per fraction. As can be seen, copper, lead, and zinc did not have any cases at any of the sample locations where results were as low as the MDL. Copper and lead both have about 67% of their mass on the < 0.063 mm fraction, around 11% on the 0.063-1 mm fraction, and around 22% on the 1-2 mm fraction. Zinc varies slightly from this with about 60% of its mass on the < 0.063 mm fraction, around 13% on the 0.063-1 mm fraction, and around 27% on the 1-2 mm fraction, so slightly more mass on the 1-2 mm fraction than for copper and lead. For arsenic and cadmium, which had several sample results at the MDL, it can be seen than when calculating the average using a value of ½ MDL value, rather than the full MDL value, result in % COC mass per fraction about the same as that for copper, lead, and zinc. In this case, arsenic has about 63% of its mass on the < 0.063 mm fraction, around 11% on the 0.063-1 mm fraction, and around 26% on the 1-2 mm fraction, and cadmium has

about 67% of its mass on the < 0.063 mm fraction, around 14% on the 0.063-1 mm fraction, and around 20% on the 1-2 mm fraction.

3.2 Literature Capture Rates Summary

EMC^2 and WWC Engineering completed an "Evaluation of Sediment Removal Efficiency for Stormwater Best Management Practices Alternatives with the Butte Priority Soils Operable Unit" for Atlantic Richfield (AR) in August, 2010 in which they conduct a review of HD capture rates of the < 0.063 mm, 0.063 – 1 mm, 1-2 mm, and > 2 mm fractions. Table A1 of this evaluation shows the HD capture size cut off fraction value at the 25%, 50%, 75%, 100%, and 125% of design flows from five different studies by Contech, NJCAT, FB Environmental Associates, and Alden Research Laboratory. The average of the results of all these studies reveals a capture size of 0.041 mm associated with 25% of design flow, 0.054 mm associated with 50% of design flow, 0.064 mm associated with 75% of design flow, 0.074 mm associated with 100% of design flow, and 0.082 mm associated with 125% of design flow. Following the methodology of the EMC^2 and WWC Engineering Evaluation, these capture sizes will be applied to the expanded analysis results to determine capture rates at various flow rates.

3.3 Application of Expanded Analysis Fraction Results to Literature Capture Rates

Tables 18 to 22 applies the Expanded Analysis fraction results from the BG-CLV-01 sample location and following the methodology found in the EMC^2 and WWC Engineering Evaluation, assigns a capture efficiency to the various fractions at various % of design flow rates by applying the above fraction cutoff rates associated with the various % of design flow rates to the Expanded Analysis fraction sediment masses. The fraction mass per fraction is then multiplied by the capture efficiency for each fraction to determine a sediment mass captured and a % of total sediment mass captured for each fraction. The COC concentration per fraction is multiplied by the sediment fraction mass to determine a total COC mass per fraction which is multiplied by the capture efficiency per fraction to determine a COC mass captured and a % of total COC mass captured for each fraction.

Similarly, Tables 23-27 applies the Expanded Analysis fraction results from all the Butte Hill sample locations to determine a sediment capture rate and a COC capture rate. Additionally, the COC capture rate is calculated for the cases when the reported value is at the MDL for scenarios of calculating the average % of COC per fraction for each fraction based on 1) the value = the MDL value, 2) the value = ½ the MDL value, and 3) the value = 0. As was suggested in Section 3.1.2, the scenario #2 likely is most representative of the actual COC values in those cases, but the other two scenarios are presented for comparison purposes.

3.4 Comparison of Expanded Analysis Calculated Capture Rate Ranges to Sample Results Capture Rate Ranges

Table 15 compares the capture rates as calculated from 1) the HD inlet vs. outlet samples (Section 2), 2) the capture rates as calculated from the Expanded Analysis results from the BG-CLV-01 sample location to the literate review capture sizes, and 3) the capture rates as calculated from the Expanded Analysis results from all the Butte Hill sample location and applying a methodology to account for cases where sample results are at the MDL value to the literate review capture sizes. Comparing the worst and best case results from the low and high values from scenarios #2 and #3, a range of capture values is recommended for each COC. These suggested ranges are compared to the HD inlet vs. outlet capture rate calculations from Section 2, and the suggested ranges all fall within the range based on the HD inlet vs. outlet capture rates within 10%. Thus the expanded analysis results applied to the literature review

capture sizes for various flow rates is considered to match the capture rate results calculated using the HD inlet vs. outlet sample results reasonably well and provide a tighter range without the negative values. The recommended capture rate for TSS is 19–50%, arsenic is 22-48%, cadmium is 18-41%, copper is 27%-42%, lead is 19-42%, and zinc is 31-67%. These results will be applied to the BG-Front Street HD in Section 4. These values are compared to the capture effectiveness evaluation method used in Section 2 and a recommended capture effectiveness range is presented in Table 15.

4.0 Application of Capture Rate Ranges to BG-Front Street HD Design Flows

It should be noted that the above suggested capture rate ranges in Section 3 are based on design flows being at 100% of design capacity and the HD being clean. In reality, early in the hydrograph the capture rates will be higher than the caputure rates calculated in Section 3 and as the HD fills up the capture efficiency will decrease. This section will calculate a composite efficiency based on these considerations while applying flows for the 5-year design storm to the proposed BG-Front Street HD with a capacity of 9.7 cfs.

The worst and best case capture effectiveness calculated in Section 2 (based on field data) and Section 3 (based on Expanded Analysis sample results applied to literature capture rates) will be implemented for this evaluation. Table 15 presents the results of the Section 2 and Section 3 analysis and presents the worst capture effectiveness and the best capture effectiveness of the two methods in blue text. Taking the best and worst case between the two methods results in TSS having a capture effectiveness range of 19-96%, arsenic 0-51%, cadmium 0-51%, copper 0-46%, lead 0-42%, and zinc 0-67%. As can be seen from this comparison, arsenic, cadmium, copper, and lead all have similar capture effectiveness ranges. Zinc has a higher high end than the other COC which is explained by zinc having a higher percentage of the overall mass on the larger grain fractions than the other COCs and the fact that the larger grain fractions are more readily captured by an HD. Based on this conclusion, copper will be the only COC evaluated in the analysis which applies the range of capture rates to the 5-year, 24-hour design storm at the BG-Front St. HD as it is concluded that copper is representative of most of the COCs.

Figure 8 shows the calculation for accumulative sediment within the HD based on the same methodology as used for the Figure 3, with Figure 3 using the 5-year storm hydrograph to determine flow volumes and the associated sediment accumulation. This calculation assumes the same difference in EMC TSS values for the HD inlet vs. outlet of 8,600 mg/L capture that was calculated at the BG-Webster Garfield HD. As Figure 8 shows, the 232 CF capacity sump of the proposed HD would fill up approximately 12.2 hours into the 5-year, 24 hour design storm. The remainder of the storm is assumed to have a capture effectiveness of zero since the HD sump would be full of sediment.

Figure 9 shows the application of the suggested capture rates shown in Table 20 for copper at various design flow rates, as well as the assumed 0% capture rate after the sump is calculated to fill up. With these assumptions and calculating a flow weighted average for the capture rate over the entire duration of the storm results in a low range 0% capture rate and a high range of 20%. This range represents the flow weighted composite efficiency of the HD device through the duration of the 5-year, 24-hr storm event.

5.0 Summary and Recommendations

The recommended capture rate ranges for TSS are 19–96%, arsenic is 0-51%, cadmium is 0-51%, copper is 0%-47%, lead is 0-42%, and zinc is 0-67%. These recommendations are valid for the first 12.2 hours of the 5-year, 24-hour storm event, after which it is assumed that the BG-Front St. HD would become full of sediment and all efficiencies thereafter would be zero.

6.0 References

Contech, 2008. CDS Guide – Operation, Design, Performance, and Maintenance, 2008.

ARCO, 2010. Evaluation of Sediment Capture Efficiency for Stormwater Best Management Practices Alternatives within the Butte Priority Soils Operable Unit, August 2010.

ARCO, 2012a. Third Cycle Up-Front Best Management Practices (BMPs) – Buffalo Gulch-Webster Garfield School Hydrodynamic Device Work Plan, February, 2012

ARCO, 2012b. Draft - Third Cycle Up-Front Best Management Practices (BMPs) – Buffalo Gulch-Front Street Hydrodynamic Device Work Plan, September, 2012

Table 1 - BG-Webster Garfield HD Measured vs. Calculated Sediment Depths and Volumes

	BG-HD East Sump				BG-HD West Sump						
Date	Inner Sump Sediment Depth (ft)	Outer Sump Sediment Depth (ft)	Volume Estimate (CF)	% Full (based on 250 CF)	Inner Sump Sediment Depth (ft)	Outer Sump Sediment Depth (ft)	Volume Estimate (CF)	% Full (based on 250 CF)	Average Measured Value	Calculated Value (3.7 ft/s velocity threshold)	Calculated Value (no velocity threshold)
6/25/2014	7.71	3.49	533.5	213.4%	7.6	3.39	525.4	210.2%	212%	260%	288%
7/8/2014	8.00	5.09	626.4	250.5%	7.5	4.79	597.8	239.1%	245%	358%	398%
7/23/2014	1.92	3.78	353.0	141.2%	1.4	2.86	260.6	104.2%	123%	32%	47%
9/12/2014	4.6	4.8	523.6	209.4%	5.3	3.9	495.6	198.3%	204%	26%	39%

Notes

1) It is expected that for conditions over full, the predicted % full will not be reached since as the HD fills up over the recommended cleanout depth, sediment will more readily scour.

2) It is speculated based on TSS removal rates after that the 7/16/15 cleanouts did not fully clean the HDs. The 123% and 204% measurement compared to the predicted 26-47% calculated values appear to confirm this speculation.

3) The HD sump depth is 3'-2.5"

Table 2 - TSS and COC Capture Efficiencies Summary

			2014 BG-Webster Garfield HD Removal Rates													
COC (TR)	Average	Std. Dev.	6/1 #1	6/1 #2	6/13	6/15	6/16	6/20 #1	6/20 #2	6/24	6/26	7/14	7/21	7/22	7/23	8/12
Copper	-101%	133%	-135%	-117%	-486%	39%	4%	58%	-106%	-66%	-98%	-156%	-7%	8%	-41%	-130%
Zinc	-66%	91%	-187%	-170%	-51%	72%	2%	65%	-112%	-110%	-105%	-223%	5%	13%	-35%	-90%
Arsenic	-24%	54%	-31%	-36%	-104%	48%	2%	67%	-95%	-31%	-39%	-131%	-24%	1%	-34%	-108%
Cadmium	-62%	89%	-125%	-117%	-132%	76%	1%	59%	-108%	-107%	-109%	-249%	-1%	12%	-16%	-153%
Lead	-105%	135%	-182%	-203%	-452%	69%	5%	54%	-83%	-84%	-70%	-180%	-5%	12%	-46%	-100%
TSS	73%	33%	88%	94%	87%	96%	56%	89%	76%	81%	-13%	83%	21%	38%	23%	72%
SS (< 0.063 mm)	-165%	148%	-476%	-120%	0%	-37%	6%	-80%	-334%	-239%	-206%	-278%	4%	0%	-73%	-227%
SS (0.063-0.25 mm)	-54%	146%	73%	68%	-129%	60%	78%	9%	-206%	21%	-461%	-51%	11%	50%	-13%	-227%
SS (0.25-1.0 mm)	82%	28%	97%	96%	92%	98%	80%	93%	82%	96%	3%	93%	60%	68%	29%	80%
SS (1-2 mm)	91%	22%	84%	99%	98%	100%	62%	97%	97%	99%	86%	98%	38%	49%	48%	93%
SS (> 2 mm)	76%	37%	0%	100%	99%	100%	26%	100%	96%	99%	62%	96%	24%	13%	71%	81%
Average Metals			-132%	-129%	-245%	61%	3%	61%	-101%	-80%	-84%	-188%	-6%	9%	-34%	-116%
Sdt Dev. Of Metals			56%	57%	185%	14%	1%	5%	10%	29%	27%	43%	10%	4%	10%	23%
Calculated Percent Full (beginning of samples)			100%	100%	6%	7%	36%	201%	215%	234%	319%	363%	0%	16%	47%	81%
Calcualated Percent Full (end of samples)			100%	100%	6%	16%	48%	202%	229%	262%	325%	363%	10%	28%	68%	110%
Average Calculated Percent Full			100%	100%	6%	12%	58%	202%	222%	248%	322%	363%	5%	22%	58%	96%
Peak Flow (of samples)			1.2	1.4	2.5	6.3	2.8	2.9	24.6	14.1	22.9	18.2	6.1	8.1	31.2	25.17
Peak Flow % of Design Flow			2.5%	2.9%	5.0%	12.7%	5.7%	5.8%	49.3%	28.2%	45.8%	36.4%	12.3%	16.2%	62.5%	50.3%
CDS Predicted TSS Removal			90-95%	90-95%	90-95%	90-95%	90-95%	90-95%	80-90%	85-92%	80-90%	85-92%	90-95%	90-95%	78-85%	80-90%
Average Flow (of samples)			1.1	1.3	2.2	4.0	2.1	1.8	14.9	6.6	10.2	6.5	3.8	5.1	12.2	15.40
# of Samples with time matches			4	2	2	3	5	4	5	3	2	7	3	3	4	7

Notes

1) The 6/15/14, 6/16, 7/21, 7/22, and 7/23 storm events are assumed to be "clean" with sediment levels below the HD sump depth.

Table 3 -TSS Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Concentration Difference (mg/L)	Event Mean Concentration In (mg/L)	Loading In (lbs)	Event Mean Concentration Out (mg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	2307	BG-HD-OUT	6/1/14 1:53 AM	0	284.4	2,022.60	2,307.00	428	284.40	53	375.3	88%
			BG-HD-IN	6/1/14 1:59 AM	7		BG-HD-OUT	6/1/14 2:02 AM	9		-						
			BG-HD-IN	6/1/14 2:01 AM	9		BG-HD-OUT	6/1/14 2:05 AM	12		-						
			BG-HD-IN	6/1/14 2:03 AM	11		BG-HD-OUT	6/1/14 2:08 AM	15		-						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		9392	BG-HD-OUT	6/1/14 1:57 PM		557.9	8,834.10	9,392.00	265	557.90	16	249.0	94%
			BG-HD-IN	6/1/14 2:12 PM	16		BG-HD-OUT	6/1/14 2:13 PM			-						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		32820	BG-HD-OUT	6/13/14 5:09 AM		3398	29,422.00	32,207.10	1662	4,219.12	218	1444.6	87%
	1.92		BG-HD-IN	6/13/14 5:25 AM	15	31410	BG-HD-OUT	6/13/14 5:24 AM		5287	26,123.00						
Storm Water - Jun 15, 2014		206571	BG-HD-IN	6/15/14 8:35 PM	0		BG-HD-OUT	6/15/14 8:33 PM	0		-	10,971.00	18787	488.15	836	17950.6	96%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	11520	BG-HD-OUT	6/15/14 8:48 PM	15	243.5	11,276.50						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	10650	BG-HD-OUT	6/15/14 9:03 PM	30	631.2	10,018.80						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	518.6	BG-HD-OUT	6/16/14 8:15 PM	0	122.9	395.70	247.90	297	108.83	130	166.8	56%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	240.1	BG-HD-OUT	6/16/14 8:30 PM	15	122.6	117.50						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	227	BG-HD-OUT	6/16/14 8:45 PM	30	112.6	114.40						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	122.6	BG-HD-OUT	6/16/14 9:15 PM	60	97.9	24.70						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	119.8	BG-HD-OUT	6/16/14 9:45 PM	90	85.8	34.00						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		19710	BG-HD-OUT	6/20/14 11:45 AM		2261	17,449.00	16,353.79	4344	1,863.24	495	3848.9	89%
	0.62		BG-HD-IN	6/20/14 12:01 PM	15	632.3	BG-HD-OUT	6/20/14 12:00 PM		623.3	9.00						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	24860	BG-HD-OUT	6/20/14 4:22 PM	0	3643	21,217.00	16,380.94	35900	3,877.74	8498	27401.7	76%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	15590	BG-HD-OUT	6/20/14 4:29 PM	7	4135	11,455.00						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	12170	BG-HD-OUT	6/20/14 4:33 PM	11	3707	8,463.00						
			BG-HD-IN	6/20/14 4:51 PM	28		BG-HD-OUT	6/20/14 4:51 PM	29		-						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	1991	BG-HD-OUT	6/24/14 4:21 PM	0	313.7	1,677.30	1,719.86	2793	325.56	529	2264.6	81%
			BG-HD-IN	6/24/14 5:52 PM	90		BG-HD-OUT	6/24/14 5:51 PM	90		-						
			BG-HD-IN	6/24/14 6:00 PM	98		BG-HD-OUT	6/24/14 6:02 PM	101		-						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	1719	BG-HD-OUT	6/24/14 6:18 PM	117	325.6	1,393.40						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526		BG-HD-OUT	6/25/14 1:06 AM	525		-						
Storm Water - Jun 26, 2014 #1		286370	BG-HD-IN	6/26/14 11:51 AM	0		BG-HD-OUT	6/26/14 11:49 AM	0		-	1,303.51	3094	1,471.57	3493	-399.0	-13%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	1304	BG-HD-OUT	6/26/14 12:00 PM	11	1662	(358.00)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	1301	BG-HD-OUT	6/26/14 12:15 PM	26	496.6	804.40						
Storm Water - Jun 26, 2014 #2		55851	BG-HD-IN	6/26/14 4:02 PM			BG-HD-OUT	6/26/14 3:56 PM			-		0		0		
			BG-HD-IN	6/26/14 5:15 PM			BG-HD-OUT	6/26/14 5:14 PM			-						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		9824	BG-HD-OUT	7/14/14 11:13 PM		1600	8,224.00	8,756.84	24794	1,471.57	4167	20627.6	83%
	3.60		BG-HD-IN	7/14/14 11:24 PM		7590	BG-HD-OUT	7/14/14 11:28 PM		477	7,113.00						
	2.86		BG-HD-IN	7/14/14 11:33 PM		9972	BG-HD-OUT	7/15/14 1:31 AM		310.1	9,661.90						
	2.35		BG-HD-IN	7/15/14 1:31 AM		6295	BG-HD-OUT	7/15/14 1:47 AM		341.5	5,953.50						
	5.01		BG-HD-IN	7/15/14 1:41 AM		10320	BG-HD-OUT	7/15/14 1:55 AM		1498	8,822.00						
	18.21		BG-HD-IN	7/15/14 1:52 AM		11420	BG-HD-OUT	7/15/14 1:58 AM		1479	9,941.00						
	6.91		BG-HD-IN	7/15/14 2:08 AM	174	477.4	BG-HD-OUT	7/15/14 2:00 AM		1485	(1,007.60)						
								7/15/14 2:19 AM	186	246.1	(246.10)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		320.9	BG-HD-OUT	7/21/14 4:50 AM		233.5	87.40	221.29	230	175.16	182	48.0	21%
	6.14		BG-HD-IN	7/21/14 5:05 AM		273.3	BG-HD-OUT	7/21/14 5:05 AM		218.7	54.60						
	4.35		BG-HD-IN	7/21/14 5:20 AM		129.1	BG-HD-OUT	7/21/14 5:20 AM		102.7	26.40						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		476.3	BG-HD-OUT	7/22/14 2:04 AM		253.8	222.50	199.22	245	123.21	152	93.5	38%
	8.08		BG-HD-IN	7/22/14 2:20 AM		270.8	BG-HD-OUT	7/22/14 2:20 AM		176.4	94.40						
	5.36		BG-HD-IN	7/22/14 2:35 AM			BG-HD-OUT	7/22/14 2:35 AM			-						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		7489	BG-HD-OUT	7/23/14 6:26 PM		5539	1,950.00	4,388.26	960	3,360.72	735	224.8	23%
	18.15		BG-HD-IN	7/23/14 6:35 PM			BG-HD-OUT	7/23/14 6:36 PM		1778	(1,778.00)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM			-						
	6.94		BG-HD-IN	7/23/14 7:14 PM		4705	BG-HD-OUT	7/23/14 7:13 PM			4,705.00						
	2.30		BG-HD-IN	7/23/14 7:29 PM		627	BG-HD-OUT	7/23/14 7:14 PM			627.00						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM			-						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		6302	BG-HD-OUT	8/12/2014 21:09		2169	4,133.00	4,481.91	20030	1,268.57	5669	14360.8	72%
	14.04		BG-HD-IN	8/12/2014 21:14		10500	BG-HD-OUT	8/12/2014 21:17		1742	8,758.00						
	16.74		BG-HD-IN	8/12/2014 21:19		5995	BG-HD-OUT	8/12/2014 21:21		1620	4,375.00						
	20.22		BG-HD-IN	8/12/2014 21:35		669	BG-HD-OUT	8/12/2014 21:42		1306	(637.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		2238	BG-HD-OUT	8/12/2014 21:46		1399	839.00						
	20.21		BG-HD-IN	8/12/2014 21:47		4844	BG-HD-OUT	8/12/2014 21:54		937	3,907.00						
	12.42		BG-HD-IN	8/12/2014 22:05			BG-HD-OUT	8/12/2014 21:56		1037	(1,037.00)						
	5.33		BG-HD-IN	8/12/2014 22:12			BG-HD-OUT	8/12/2014 22:12		391	(391.00)						

Minimum Percentage Difference	**-13%**
Average Percentage Difference	**73%**
Maximum Percentage Difference	**96%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 4 -SS < 0.063 mm Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Concentration Difference (mg/L)	Event Mean Concentration In (mg/L)	Loading In (lbs)	Event Mean Concentration Out (mg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	25.7	BG-HD-OUT	6/1/14 1:53 AM	0	148	(122.30)	25.70	4.8	148.00	27.5	(22.69)	-476%
			BG-HD-IN	6/1/14 1:59 AM	7		BG-HD-OUT	6/1/14 2:02 AM	9		-						
			BG-HD-IN	6/1/14 2:01 AM	9		BG-HD-OUT	6/1/14 2:05 AM	12		-						
			BG-HD-IN	6/1/14 2:03 AM	11		BG-HD-OUT	6/1/14 2:08 AM	15		-						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		70.6	BG-HD-OUT	6/1/14 1:57 PM		155.6	(85.00)	70.60	2.0	155.60	4.4	(2.40)	-120%
			BG-HD-IN	6/1/14 2:12 PM			BG-HD-OUT	6/1/14 2:13 PM			-						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		64	BG-HD-OUT	6/13/14 5:09 AM		454.7	(390.70)	66.26	3.4	448.14	23.1	(19.71)	-576%
	1.92		BG-HD-IN	6/13/14 5:25 AM		69.2	BG-HD-OUT	6/13/14 5:24 AM		439.6	(370.40)						
Storm Water - Jun 15, 2014		206571	BG-HD-IN	6/15/14 8:35 PM	0		BG-HD-OUT	6/15/14 8:33 PM	0		-	113.92	195.1	155.92	267.0	(71.92)	-37%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	59.9	BG-HD-OUT	6/15/14 8:48 PM	15	130.8	(70.90)						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	145.5	BG-HD-OUT	6/15/14 9:03 PM	30	170.6	(25.10)						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	85.5	BG-HD-OUT	6/16/14 8:15 PM	0	71.2	14.30	63.52	76.2	59.59	71.4	4.72	6%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	61.4	BG-HD-OUT	6/16/14 8:30 PM	15	49.8	11.60						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	51.2	BG-HD-OUT	6/16/14 8:45 PM	30	51.7	(0.50)						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	63.4	BG-HD-OUT	6/16/14 9:15 PM	60	66.2	(2.80)						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	48.1	BG-HD-OUT	6/16/14 9:45 PM	90	52.3	(4.20)						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		320	BG-HD-OUT	6/20/14 11:45 AM		666	(346.00)	305.35	81.1	548.84	145.8	(64.67)	-80%
	0.62		BG-HD-IN	6/20/14 12:01 PM		236.7	BG-HD-OUT	6/20/14 12:00 PM		344.1	(107.40)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	550.9	BG-HD-OUT	6/20/14 4:22 PM	0	726.1	(175.20)	242.53	531.5	1,053.38	2308.6	(1,777.04)	-334%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	177.8	BG-HD-OUT	6/20/14 4:29 PM	7	1133	(955.20)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	133.3	BG-HD-OUT	6/20/14 4:33 PM	11	1156	(1,022.70)						
			BG-HD-IN	6/20/14 4:51 PM	28		BG-HD-OUT	6/20/14 4:51 PM	29		-						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	205	BG-HD-OUT	6/24/14 4:21 PM	0	219.9	(14.90)	60.26	97.9	204.45	332.1	(234.19)	-239%
			BG-HD-IN	6/24/14 5:52 PM	90		BG-HD-OUT	6/24/14 5:51 PM	90		-						
			BG-HD-IN	6/24/14 6:00 PM	98		BG-HD-OUT	6/24/14 6:02 PM	101		-						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	59.8	BG-HD-OUT	6/24/14 6:18 PM	117	204.4	(144.60)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526		BG-HD-OUT	6/25/14 1:06 AM	525		-						
Storm Water - Jun 26, 2014 #1		286370	BG-HD-IN	6/26/14 11:51 AM	0		BG-HD-OUT	6/26/14 11:49 AM	0		-	121.89	289.4	373.10	885.7	(596.34)	-206%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	121.6	BG-HD-OUT	6/26/14 12:00 PM	11	398.4	(276.80)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	123.4	BG-HD-OUT	6/26/14 12:15 PM	26	243.6	(120.20)						
Storm Water - Jun 26, 2014 #2		55851	BG-HD-IN	6/26/14 4:02 PM			BG-HD-OUT	6/26/14 3:56 PM			-		0.0		0.0		
			BG-HD-IN	6/26/14 5:15 PM			BG-HD-OUT	6/26/14 5:14 PM			-						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		125	BG-HD-OUT	7/14/14 11:13 PM		485.2	(360.20)	96.13	272.2	363.34	1028.8	(756.58)	-278%
	3.60		BG-HD-IN	7/14/14 11:24 PM		126.7	BG-HD-OUT	7/14/14 11:28 PM		213.7	(87.00)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		136.6	BG-HD-OUT	7/15/14 1:31 AM		104.7	31.90						
	2.35		BG-HD-IN	7/15/14 1:31 AM		104.5	BG-HD-OUT	7/15/14 1:47 AM		142.2	(37.70)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		88.1	BG-HD-OUT	7/15/14 1:55 AM		417.5	(329.40)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		57.4	BG-HD-OUT	7/15/14 1:58 AM		525.1	(467.70)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		139.7	BG-HD-OUT	7/15/14 2:00 AM		275.5	(135.80)						
								7/15/14 2:19 AM		145.1	(145.10)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		108.5	BG-HD-OUT	7/21/14 4:50 AM		124.2	(15.70)	81.97	85.4	78.52	81.8	3.60	4%
	6.14		BG-HD-IN	7/21/14 5:05 AM		103	BG-HD-OUT	7/21/14 5:05 AM		90	13.00						
	4.35		BG-HD-IN	7/21/14 5:20 AM		47.3	BG-HD-OUT	7/21/14 5:20 AM		53.7	(6.40)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		115.1	BG-HD-OUT	7/22/14 2:04 AM		105	10.10	49.02	60.3	48.86	60.1	0.20	0%
	8.08		BG-HD-IN	7/22/14 2:20 AM		67.1	BG-HD-OUT	7/22/14 2:20 AM		69	(1.90)						
	5.36		BG-HD-IN	7/22/14 2:35 AM			BG-HD-OUT	7/22/14 2:35 AM			-						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		221.6	BG-HD-OUT	7/23/14 6:26 PM		284.8	(63.20)	133.32	29.2	230.82	50.5	(21.33)	-73%
	18.15		BG-HD-IN	7/23/14 6:35 PM			BG-HD-OUT	7/23/14 6:36 PM		286.8	(286.80)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM			-						
	6.94		BG-HD-IN	7/23/14 7:14 PM		118.8	BG-HD-OUT	7/23/14 7:13 PM			118.80						
	2.30		BG-HD-IN	7/23/14 7:29 PM		172.6	BG-HD-OUT	7/23/14 7:14 PM			172.60						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM			-						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		301	BG-HD-OUT	8/12/2014 21:09		427	(126.00)	76.77	343.1	251.22	1122.7	-779.6	-227%
	14.04		BG-HD-IN	8/12/2014 21:14		76	BG-HD-OUT	8/12/2014 21:17		303	(227.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		25	BG-HD-OUT	8/12/2014 21:21		315	(290.00)						
	20.22		BG-HD-IN	8/12/2014 21:35		33	BG-HD-OUT	8/12/2014 21:42		337	(304.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		71	BG-HD-OUT	8/12/2014 21:46		241	(170.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		71	BG-HD-OUT	8/12/2014 21:54		218	(147.00)						
	12.42		BG-HD-IN	8/12/2014 22:05			BG-HD-OUT	8/12/2014 21:56		118	(118.00)						
	5.33		BG-HD-IN	8/12/2014 22:12			BG-HD-OUT	8/12/2014 22:12		51	(51.00)						

Minimum Percentage Difference	**-576%**
Average Percentage Difference	**-229%**
Maximum Percentage Difference	**6%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 5 -SS 0.063 - 0.25 mm Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Concentration Difference (mg/L)	Event Mean Concentration In (mg/L)	Loading In (lbs)	Event Mean Concentration Out (mg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	176	BG-HD-OUT	6/1/14 1:53 AM	0	48.4	127.60	176.00	32.7	48.40	9.0	23.67	73%
			BG-HD-IN	6/1/14 1:59 AM	7		BG-HD-OUT	6/1/14 2:02 AM	9		-						
			BG-HD-IN	6/1/14 2:01 AM	9		BG-HD-OUT	6/1/14 2:05 AM	12		-						
			BG-HD-IN	6/1/14 2:03 AM	11		BG-HD-OUT	6/1/14 2:08 AM	15		-						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		240.5	BG-HD-OUT	6/1/14 1:57 PM		76.6	163.90	240.50	6.8	76.60	2.2	4.62	68%
			BG-HD-IN	6/1/14 2:12 PM			BG-HD-OUT	6/1/14 2:13 PM			-						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		683	BG-HD-OUT	6/13/14 5:09 AM		667.1	15.90	531.95	27.5	1,220.41	63.0	(35.53)	-129%
	1.92		BG-HD-IN	6/13/14 5:25 AM		335.5	BG-HD-OUT	6/13/14 5:24 AM		1940	(1,604.50)						
Storm Water - Jun 15, 2014		206571	BG-HD-IN	6/15/14 8:35 PM	0		BG-HD-OUT	6/15/14 8:33 PM	0		-	484.58	829.8	193.65	331.6	498.18	60%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	229.7	BG-HD-OUT	6/15/14 8:48 PM	15	84.1	145.60						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	633.6	BG-HD-OUT	6/15/14 9:03 PM	30	257.7	375.90						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	167.6	BG-HD-OUT	6/16/14 8:15 PM	0	13.3	154.30	58.04	69.6	12.58	15.1	54.52	78%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	39	BG-HD-OUT	6/16/14 8:30 PM	15	14.8	24.20						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	30.3	BG-HD-OUT	6/16/14 8:45 PM	30	14.4	15.90						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	21.5	BG-HD-OUT	6/16/14 9:15 PM	60	12.1	9.40						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	22.5	BG-HD-OUT	6/16/14 9:45 PM	90	7.4	15.10						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		1085	BG-HD-OUT	6/20/14 11:45 AM		1025	60.00	925.60	245.9	844.68	224.4	21.49	9%
	0.62		BG-HD-IN	6/20/14 12:01 PM		178.9	BG-HD-OUT	6/20/14 12:00 PM		178.1	0.80						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	966.5	BG-HD-OUT	6/20/14 4:22 PM	0	1360	(393.50)	499.57	1094.8	1,527.56	3347.8	(2,252.91)	-206%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	458.7	BG-HD-OUT	6/20/14 4:29 PM	7	1697	(1,238.30)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	264.4	BG-HD-OUT	6/20/14 4:33 PM	11	1423	(1,158.60)						
			BG-HD-IN	6/20/14 4:51 PM	28		BG-HD-OUT	6/20/14 4:51 PM	29		-						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	116.8	BG-HD-OUT	6/24/14 4:21 PM	0	51	65.80	103.44	168.0	81.30	132.1	35.96	21%
			BG-HD-IN	6/24/14 5:52 PM	90		BG-HD-OUT	6/24/14 5:51 PM	90		-						
			BG-HD-IN	6/24/14 6:00 PM	98		BG-HD-OUT	6/24/14 6:02 PM	101		-						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	103.4	BG-HD-OUT	6/24/14 6:18 PM	117	81.4	22.00						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526		BG-HD-OUT	6/25/14 1:06 AM	525		-						
Storm Water - Jun 26, 2014 #1		286370	BG-HD-IN	6/26/14 11:51 AM	0		BG-HD-OUT	6/26/14 11:49 AM	0		-	67.49	160.2	378.34	898.1	(737.92)	-461%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	58.5	BG-HD-OUT	6/26/14 12:00 PM	11	435.4	(376.90)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	113.5	BG-HD-OUT	6/26/14 12:15 PM	26	86.2	27.30						
Storm Water - Jun 26, 2014 #2		55851	BG-HD-IN	6/26/14 4:02 PM			BG-HD-OUT	6/26/14 3:56 PM			-		0.0		0.0		
			BG-HD-IN	6/26/14 5:15 PM			BG-HD-OUT	6/26/14 5:14 PM			-						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		374.7	BG-HD-OUT	7/14/14 11:13 PM		809.6	(434.90)	321.67	910.8	484.79	1372.6	(461.84)	-51%
	3.60		BG-HD-IN	7/14/14 11:24 PM		304.5	BG-HD-OUT	7/14/14 11:28 PM		145.1	159.40						
	2.86		BG-HD-IN	7/14/14 11:33 PM		566.7	BG-HD-OUT	7/15/14 1:31 AM		71.2	495.50						
	2.35		BG-HD-IN	7/15/14 1:31 AM		231.6	BG-HD-OUT	7/15/14 1:47 AM		98.4	133.20						
	5.01		BG-HD-IN	7/15/14 1:41 AM		359.1	BG-HD-OUT	7/15/14 1:55 AM		557.5	(198.40)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		367	BG-HD-OUT	7/15/14 1:58 AM		417.4	(50.40)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		60.3	BG-HD-OUT	7/15/14 2:00 AM		650.2	(589.90)						
								7/15/14 2:19 AM		34	(34.00)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		108.8	BG-HD-OUT	7/21/14 4:50 AM		74.5	34.30	62.30	64.9	55.42	57.7	7.16	11%
	6.14		BG-HD-IN	7/21/14 5:05 AM		75	BG-HD-OUT	7/21/14 5:05 AM		74.5	0.50						
	4.35		BG-HD-IN	7/21/14 5:20 AM		35.6	BG-HD-OUT	7/21/14 5:20 AM		24.9	10.70						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		142.5	BG-HD-OUT	7/22/14 2:04 AM		82.9	59.60	54.39	66.9	27.16	33.4	33.49	50%
	8.08		BG-HD-IN	7/22/14 2:20 AM		71.2	BG-HD-OUT	7/22/14 2:20 AM		33	38.20						
	5.36		BG-HD-IN	7/22/14 2:35 AM			BG-HD-OUT	7/22/14 2:35 AM			-						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		1939	BG-HD-OUT	7/23/14 6:26 PM		1776	163.00	1,031.99	225.8	1,168.79	255.7	(29.93)	-13%
	18.15		BG-HD-IN	7/23/14 6:35 PM			BG-HD-OUT	7/23/14 6:36 PM		877.3	(877.30)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM			-						
	6.94		BG-HD-IN	7/23/14 7:14 PM		335.2	BG-HD-OUT	7/23/14 7:13 PM			335.20						
	2.30		BG-HD-IN	7/23/14 7:29 PM		60.2	BG-HD-OUT	7/23/14 7:14 PM			60.20						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM			-						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		602	BG-HD-OUT	8/12/2014 21:09		736	(134.00)	173.44	775.1	341.91	1528.0	-752.9	-97%
	14.04		BG-HD-IN	8/12/2014 21:14		458	BG-HD-OUT	8/12/2014 21:17		501	(43.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		82	BG-HD-OUT	8/12/2014 21:21		360	(278.00)						
	20.22		BG-HD-IN	8/12/2014 21:35		31	BG-HD-OUT	8/12/2014 21:42		388	(357.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		100	BG-HD-OUT	8/12/2014 21:46		329	(229.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		94	BG-HD-OUT	8/12/2014 21:54		208	(114.00)						
	12.42		BG-HD-IN	8/12/2014 22:05			BG-HD-OUT	8/12/2014 21:56		106	(106.00)						
	5.33		BG-HD-IN	8/12/2014 22:12			BG-HD-OUT	8/12/2014 22:12		8	(8.00)						

Minimum Percentage Difference	**-461%**
Average Percentage Difference	**-54%**
Maximum Percentage Difference	**78%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 6 -SS 0.25 - 1 mm Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Concentration Difference (mg/L)	Event Mean Concentration In (mg/L)	Loading In (lbs)	Event Mean Concentration Out (mg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	1660	BG-HD-OUT	6/1/14 1:53 AM	0	48.9	1,611.10	1,660.00	308.0	48.90	9.1	298.91	97%
			BG-HD-IN	6/1/14 1:59 AM	7		BG-HD-OUT	6/1/14 2:02 AM	9		-						
			BG-HD-IN	6/1/14 2:01 AM	9		BG-HD-OUT	6/1/14 2:05 AM	12		-						
			BG-HD-IN	6/1/14 2:03 AM	11		BG-HD-OUT	6/1/14 2:08 AM	15		-						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		3618	BG-HD-OUT	6/1/14 1:57 PM		159.6	3,458.40	3,618.00	102.0	159.60	4.5	97.50	96%
			BG-HD-IN	6/1/14 2:12 PM			BG-HD-OUT	6/1/14 2:13 PM			-						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		14660	BG-HD-OUT	6/13/14 5:09 AM		261.5	14,398.50	9,579.41	494.4	783.77	40.5	453.98	92%
	1.92		BG-HD-IN	6/13/14 5:25 AM		2972	BG-HD-OUT	6/13/14 5:24 AM		1463	1,509.00						
Storm Water - Jun 15, 2014		206571	BG-HD-IN	6/15/14 8:35 PM	0		BG-HD-OUT	6/15/14 8:33 PM	0		-	3,695.11	6327.4	61.88	106.0	6,221.47	98%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	3331	BG-HD-OUT	6/15/14 8:48 PM	15	36.7	3,294.30						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	3908	BG-HD-OUT	6/15/14 9:03 PM	30	76.6	3,831.40						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	159.7	BG-HD-OUT	6/16/14 8:15 PM	0	19	140.70	64.17	77.0	13.12	15.7	61.21	80%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	63.2	BG-HD-OUT	6/16/14 8:30 PM	15	14.8	48.40						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	60.6	BG-HD-OUT	6/16/14 8:45 PM	30	11.3	49.30						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	14.2	BG-HD-OUT	6/16/14 9:15 PM	60	10.1	4.10						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	23.1	BG-HD-OUT	6/16/14 9:45 PM	90	9.9	13.20						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		3233	BG-HD-OUT	6/20/14 11:45 AM		233.9	2,999.10	2,674.64	710.4	192.75	51.2	659.22	93%
	0.62		BG-HD-IN	6/20/14 12:01 PM		59.1	BG-HD-OUT	6/20/14 12:00 PM		49.9	9.20						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	3990	BG-HD-OUT	6/20/14 4:22 PM	0	764.6	3,225.40	3,944.60	8644.9	720.03	1578.0	7,066.89	82%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	5419	BG-HD-OUT	6/20/14 4:29 PM	7	757	4,662.00						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	2117	BG-HD-OUT	6/20/14 4:33 PM	11	647.7	1,469.30						
			BG-HD-IN	6/20/14 4:51 PM	28		BG-HD-OUT	6/20/14 4:51 PM	29		-						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	903.7	BG-HD-OUT	6/24/14 4:21 PM	0	18.9	884.80	753.88	1224.4	27.77	45.1	1,179.34	96%
			BG-HD-IN	6/24/14 5:52 PM	90		BG-HD-OUT	6/24/14 5:51 PM	90		-						
			BG-HD-IN	6/24/14 6:00 PM	98		BG-HD-OUT	6/24/14 6:02 PM	101		-						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	753.4	BG-HD-OUT	6/24/14 6:18 PM	117	36.6	716.80						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526		BG-HD-OUT	6/25/14 1:06 AM	525		-						
Storm Water - Jun 26, 2014 #1		286370	BG-HD-IN	6/26/14 11:51 AM	0		BG-HD-OUT	6/26/14 11:49 AM	0		-	552.66	1311.9	536.76	1274.2	37.74	3%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	533	BG-HD-OUT	6/26/14 12:00 PM	11	618.3	(85.30)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	653.3	BG-HD-OUT	6/26/14 12:15 PM	26	119.3	534.00						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM			BG-HD-OUT	6/26/14 3:56 PM			-		0.0		0.0		
	8.10		BG-HD-IN	6/26/14 5:15 PM			BG-HD-OUT	6/26/14 5:14 PM			-						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		4217	BG-HD-OUT	7/14/14 11:13 PM		179.7	4,037.30	4,163.53	11788.7	302.83	857.4	10,931.25	93%
	3.60		BG-HD-IN	7/14/14 11:24 PM		2921	BG-HD-OUT	7/14/14 11:28 PM		46.5	2,874.50						
	2.86		BG-HD-IN	7/14/14 11:33 PM		5847	BG-HD-OUT	7/15/14 1:31 AM		65	5,782.00						
	2.35		BG-HD-IN	7/15/14 1:31 AM		3301	BG-HD-OUT	7/15/14 1:47 AM		49.3	3,251.70						
	5.01		BG-HD-IN	7/15/14 1:41 AM		5395	BG-HD-OUT	7/15/14 1:55 AM		308.9	5,086.10						
	18.21		BG-HD-IN	7/15/14 1:52 AM		5424	BG-HD-OUT	7/15/14 1:58 AM		359.3	5,064.70						
	6.91		BG-HD-IN	7/15/14 2:08 AM		138.3	BG-HD-OUT	7/15/14 2:00 AM		458.6	(320.30)						
								7/15/14 2:19 AM		12.7	(12.70)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		72.7	BG-HD-OUT	7/21/14 4:50 AM		26.9	45.80	63.77	66.4	25.79	26.8	39.55	60%
	6.14		BG-HD-IN	7/21/14 5:05 AM		81.9	BG-HD-OUT	7/21/14 5:05 AM		34.7	47.20						
	4.35		BG-HD-IN	7/21/14 5:20 AM		36.5	BG-HD-OUT	7/21/14 5:20 AM		13	23.50						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		140.2	BG-HD-OUT	7/22/14 2:04 AM		43.2	97.00	61.29	75.4	19.58	24.1	51.32	68%
	8.08		BG-HD-IN	7/22/14 2:20 AM		84.7	BG-HD-OUT	7/22/14 2:20 AM		27.4	57.30						
	5.36		BG-HD-IN	7/22/14 2:35 AM			BG-HD-OUT	7/22/14 2:35 AM			-						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		2930	BG-HD-OUT	7/23/14 6:26 PM		2358	572.00	1,900.85	415.8	1,352.38	295.8	119.98	29%
	18.15		BG-HD-IN	7/23/14 6:35 PM			BG-HD-OUT	7/23/14 6:36 PM		493.2	(493.20)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM			-						
	6.94		BG-HD-IN	7/23/14 7:14 PM		3465	BG-HD-OUT	7/23/14 7:13 PM			3,465.00						
	2.30		BG-HD-IN	7/23/14 7:29 PM		229.3	BG-HD-OUT	7/23/14 7:14 PM			229.30						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM			-						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		1330	BG-HD-OUT	8/12/2014 21:09		544	786.00	1,701.28	7603.2	343.90	1536.9	6066.3	80%
	14.04		BG-HD-IN	8/12/2014 21:14		5495	BG-HD-OUT	8/12/2014 21:17		401	5,094.00						
	16.74		BG-HD-IN	8/12/2014 21:19		1482	BG-HD-OUT	8/12/2014 21:21		574	908.00						
	20.22		BG-HD-IN	8/12/2014 21:35		201	BG-HD-OUT	8/12/2014 21:42		242	(41.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		1007	BG-HD-OUT	8/12/2014 21:46		434	573.00						
	20.21		BG-HD-IN	8/12/2014 21:47		1779	BG-HD-OUT	8/12/2014 21:54		282	1,497.00						
	12.42		BG-HD-IN	8/12/2014 22:05			BG-HD-OUT	8/12/2014 21:56		139	(139.00)						
	5.33		BG-HD-IN	8/12/2014 22:12			BG-HD-OUT	8/12/2014 22:12		18	(18.00)						

Minimum Percentage Difference	**3%**
Average Percentage Difference	**82%**
Maximum Percentage Difference	**98%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 7 -SS 1 - 2 mm Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Concentration Difference (mg/L)	Event Mean Concentration In (mg/L)	Loading In (lbs)	Event Mean Concentration Out (mg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	186.9	BG-HD-OUT	6/1/14 1:53 AM	0	30	156.90	186.90	34.7	30.00	5.6	29.11	84%
			BG-HD-IN	6/1/14 1:59 AM	7		BG-HD-OUT	6/1/14 2:02 AM	9		-						
			BG-HD-IN	6/1/14 2:01 AM	9		BG-HD-OUT	6/1/14 2:05 AM	12		-						
			BG-HD-IN	6/1/14 2:03 AM	11		BG-HD-OUT	6/1/14 2:08 AM	15		-						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		3386	BG-HD-OUT	6/1/14 1:57 PM		33.9	3,352.10	3,386.00	95.5	33.90	1.0	94.50	99%
			BG-HD-IN	6/1/14 2:12 PM			BG-HD-OUT	6/1/14 2:13 PM			-						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		14500	BG-HD-OUT	6/13/14 5:09 AM		28.2	14,471.80	14,265.27	736.3	240.37	12.4	723.89	98%
	1.92		BG-HD-IN	6/13/14 5:25 AM		13960	BG-HD-OUT	6/13/14 5:24 AM		516.3	13,443.70						
Storm Water - Jun 15, 2014		206571	BG-HD-IN	6/15/14 8:35 PM	0		BG-HD-OUT	6/15/14 8:33 PM	0		-	4,423.47	7574.7	17.51	30.0	7,544.68	100%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	6150	BG-HD-OUT	6/15/14 8:48 PM	15	12.4	6,137.60						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	3414	BG-HD-OUT	6/15/14 9:03 PM	30	20.5	3,393.50						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	27.4	BG-HD-OUT	6/16/14 8:15 PM	0	13.2	14.20	20.63	24.7	7.87	9.4	15.30	62%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	31.9	BG-HD-OUT	6/16/14 8:30 PM	15	6.9	25.00						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	34.3	BG-HD-OUT	6/16/14 8:45 PM	30	6.24	28.06						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	6.5	BG-HD-OUT	6/16/14 9:15 PM	60	6.24	0.26						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	6.8	BG-HD-OUT	6/16/14 9:45 PM	90	6.24	0.56						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		1794	BG-HD-OUT	6/20/14 11:45 AM		52.2	1,741.80	1,482.40	393.7	43.02	11.4	382.32	97%
	0.62		BG-HD-IN	6/20/14 12:01 PM		22.8	BG-HD-OUT	6/20/14 12:00 PM		25.6	(2.80)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	4135	BG-HD-OUT	6/20/14 4:22 PM	0	265.5	3,869.50	4,271.06	9360.4	140.18	307.2	9,053.15	97%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	5581	BG-HD-OUT	6/20/14 4:29 PM	7	91	5,490.00						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	2755	BG-HD-OUT	6/20/14 4:33 PM	11	123.7	2,631.30						
			BG-HD-IN	6/20/14 4:51 PM	28		BG-HD-OUT	6/20/14 4:51 PM	29		-						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	541.1	BG-HD-OUT	6/24/14 4:21 PM	0	6.5	534.60	447.80	727.3	6.24	10.1	717.17	99%
			BG-HD-IN	6/24/14 5:52 PM	90		BG-HD-OUT	6/24/14 5:51 PM	90		-						
			BG-HD-IN	6/24/14 6:00 PM	98		BG-HD-OUT	6/24/14 6:02 PM	101		-						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	447.5	BG-HD-OUT	6/24/14 6:18 PM	117	6.24	441.26						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526		BG-HD-OUT	6/25/14 1:06 AM	525		-						
Storm Water - Jun 26, 2014 #1		286370	BG-HD-IN	6/26/14 11:51 AM	0		BG-HD-OUT	6/26/14 11:49 AM	0		-	326.53	775.1	47.10	111.8	663.35	86%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	340.7	BG-HD-OUT	6/26/14 12:00 PM	11	52.7	288.00						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	254	BG-HD-OUT	6/26/14 12:15 PM	26	18.4	235.60						
Storm Water - Jun 26, 2014 #2		55851	BG-HD-IN	6/26/14 4:02 PM			BG-HD-OUT	6/26/14 3:56 PM			-		0.0		0.0		
			BG-HD-IN	6/26/14 5:15 PM			BG-HD-OUT	6/26/14 5:14 PM			-						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		3369	BG-HD-OUT	7/14/14 11:13 PM		38.7	3,330.30	3,006.14	8511.6	63.00	178.4	8,333.25	98%
	3.60		BG-HD-IN	7/14/14 11:24 PM		2217	BG-HD-OUT	7/14/14 11:28 PM		17.4	2,199.60						
	2.86		BG-HD-IN	7/14/14 11:33 PM		2674	BG-HD-OUT	7/15/14 1:31 AM		12.7	2,661.30						
	2.35		BG-HD-IN	7/15/14 1:31 AM		2018	BG-HD-OUT	7/15/14 1:47 AM		17.3	2,000.70						
	5.01		BG-HD-IN	7/15/14 1:41 AM		3389	BG-HD-OUT	7/15/14 1:55 AM		79.4	3,309.60						
	18.21		BG-HD-IN	7/15/14 1:52 AM		4230	BG-HD-OUT	7/15/14 1:58 AM		77.3	4,152.70						
	6.91		BG-HD-IN	7/15/14 2:08 AM		23.4	BG-HD-OUT	7/15/14 2:00 AM		72.8	(49.40)						
								7/15/14 2:19 AM		9.1	(9.10)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		13.8	BG-HD-OUT	7/21/14 4:50 AM		7.2	6.60	10.24	10.7	6.31	6.6	4.09	38%
	6.14		BG-HD-IN	7/21/14 5:05 AM		12.6	BG-HD-OUT	7/21/14 5:05 AM		6.24	6.36						
	4.35		BG-HD-IN	7/21/14 5:20 AM		6.24	BG-HD-OUT	7/21/14 5:20 AM		6.24	-						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		17.9	BG-HD-OUT	7/22/14 2:04 AM		12.4	5.50	9.57	11.8	4.84	6.0	5.82	49%
	8.08		BG-HD-IN	7/22/14 2:20 AM		14.1	BG-HD-OUT	7/22/14 2:20 AM		6.4	7.70						
	5.36		BG-HD-IN	7/22/14 2:35 AM			BG-HD-OUT	7/22/14 2:35 AM			-						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		1303	BG-HD-OUT	7/23/14 6:26 PM		716.9	586.10	738.14	161.5	381.45	83.4	78.03	48%
	18.15		BG-HD-IN	7/23/14 6:35 PM			BG-HD-OUT	7/23/14 6:36 PM		49.9	(49.90)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM			-						
	6.94		BG-HD-IN	7/23/14 7:14 PM		605.9	BG-HD-OUT	7/23/14 7:13 PM			605.90						
	2.30		BG-HD-IN	7/23/14 7:29 PM		77.4	BG-HD-OUT	7/23/14 7:14 PM			77.40						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM			-						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		3320	BG-HD-OUT	8/12/2014 21:09		102	3,218.00	1,616.08	7222.4	110.35	493.2	6729.3	93%
	14.04		BG-HD-IN	8/12/2014 21:14		2954	BG-HD-OUT	8/12/2014 21:17		122	2,832.00						
	16.74		BG-HD-IN	8/12/2014 21:19		2789	BG-HD-OUT	8/12/2014 21:21		166	2,623.00						
	20.22		BG-HD-IN	8/12/2014 21:35		83	BG-HD-OUT	8/12/2014 21:42		92	(9.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		702	BG-HD-OUT	8/12/2014 21:46		171	531.00						
	20.21		BG-HD-IN	8/12/2014 21:47		1626	BG-HD-OUT	8/12/2014 21:54		55	1,571.00						
	12.42		BG-HD-IN	8/12/2014 22:05			BG-HD-OUT	8/12/2014 21:56		41	(41.00)						
	5.33		BG-HD-IN	8/12/2014 22:12			BG-HD-OUT	8/12/2014 22:12		6	(6.00)						

Minimum Percentage Difference	**62%**
Average Percentage Difference	**91%**
Maximum Percentage Difference	**100%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 8 - SS > 2 mm Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Location	Sample Time	Time from Start (min)	Concentration (mg/L)	Concentration Difference (mg/L)	Event Mean Concentration In (mg/L)	Loading In (lbs)	Event Mean Concentration Out (mg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	6.24	BG-HD-OUT	6/1/14 1:53 AM	0	6.24	-	6.24	1.2	6.24	1.2	-	0%
			BG-HD-IN	6/1/14 1:59 AM	7		BG-HD-OUT	6/1/14 2:02 AM	9		-						
			BG-HD-IN	6/1/14 2:01 AM	9		BG-HD-OUT	6/1/14 2:05 AM	12		-						
			BG-HD-IN	6/1/14 2:03 AM	11		BG-HD-OUT	6/1/14 2:08 AM	15		-						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		1680	BG-HD-OUT	6/1/14 1:57 PM		6.24	1,673.76	1,680.00	47.4	6.24	0.2	47.19	100%
			BG-HD-IN	6/1/14 2:12 PM			BG-HD-OUT	6/1/14 2:13 PM			-						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		2825	BG-HD-OUT	6/13/14 5:09 AM		6.24	2,818.76	7,600.01	392.3	106.16	5.5	386.79	99%
	1.92		BG-HD-IN	6/13/14 5:25 AM		13810	BG-HD-OUT	6/13/14 5:24 AM		236.1	13,573.90						
Storm Water - Jun 15, 2014		206571	BG-HD-IN	6/15/14 8:35 PM	0		BG-HD-OUT	6/15/14 8:33 PM	0		-	2,163.83	3705.3	6.24	10.7	3,694.62	100%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	1724	BG-HD-OUT	6/15/14 8:48 PM	15	6.24	1,717.76						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	2421	BG-HD-OUT	6/15/14 9:03 PM	30	6.24	2,414.76						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	15.3	BG-HD-OUT	6/16/14 8:15 PM	0	6.24	9.06	8.42	10.1	6.24	7.5	2.62	26%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	7.4	BG-HD-OUT	6/16/14 8:30 PM	15	6.24	1.16						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	6.24	BG-HD-OUT	6/16/14 8:45 PM	30	6.24	-						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	6.24	BG-HD-OUT	6/16/14 9:15 PM	60	6.24	-						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	6.24	BG-HD-OUT	6/16/14 9:45 PM	90	6.24	-						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		13040	BG-HD-OUT	6/20/14 11:45 AM		6.24	13,033.76	10,762.16	2858.6	5.14	1.4	2,857.21	100%
	0.62		BG-HD-IN	6/20/14 12:01 PM		92.1	BG-HD-OUT	6/20/14 12:00 PM		6.24	85.86						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	14900	BG-HD-OUT	6/20/14 4:22 PM	0	434.5	14,465.50	7,182.72	15741.5	275.69	604.2	15,137.30	96%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	3645	BG-HD-OUT	6/20/14 4:29 PM	7	323.4	3,321.60						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	6790	BG-HD-OUT	6/20/14 4:33 PM	11	120.5	6,669.50						
			BG-HD-IN	6/20/14 4:51 PM	28		BG-HD-OUT	6/20/14 4:51 PM	29		-						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	198.1	BG-HD-OUT	6/24/14 4:21 PM	0	6.24	191.86	324.20	526.6	4.74	7.7	518.86	99%
			BG-HD-IN	6/24/14 5:52 PM	90		BG-HD-OUT	6/24/14 5:51 PM	90		-						
			BG-HD-IN	6/24/14 6:00 PM	98		BG-HD-OUT	6/24/14 6:02 PM	101		-						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	324.6	BG-HD-OUT	6/24/14 6:18 PM	117	6.24	318.36						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526		BG-HD-OUT	6/25/14 1:06 AM	525		-						
Storm Water - Jun 26, 2014 #1		286370	BG-HD-IN	6/26/14 11:51 AM	0		BG-HD-OUT	6/26/14 11:49 AM	0		-	207.94	493.6	79.66	189.1	304.50	62%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	223.1	BG-HD-OUT	6/26/14 12:00 PM	11	93.7	129.40						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	130.3	BG-HD-OUT	6/26/14 12:15 PM	26	7.8	122.50						
Storm Water - Jun 26, 2014 #2		55851	BG-HD-IN	6/26/14 4:02 PM			BG-HD-OUT	6/26/14 3:56 PM			-		0.0		0.0		
			BG-HD-IN	6/26/14 5:15 PM			BG-HD-OUT	6/26/14 5:14 PM			-						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		1661	BG-HD-OUT	7/14/14 11:13 PM		6.24	1,654.76	1,090.44	3087.5	41.55	117.6	2,969.85	96%
	3.60		BG-HD-IN	7/14/14 11:24 PM		1885	BG-HD-OUT	7/14/14 11:28 PM		6.24	1,878.76						
	2.86		BG-HD-IN	7/14/14 11:33 PM		665.3	BG-HD-OUT	7/15/14 1:31 AM		6.24	659.06						
	2.35		BG-HD-IN	7/15/14 1:31 AM		618.3	BG-HD-OUT	7/15/14 1:47 AM		6.24	612.06						
	5.01		BG-HD-IN	7/15/14 1:41 AM		944.1	BG-HD-OUT	7/15/14 1:55 AM		97.9	846.20						
	18.21		BG-HD-IN	7/15/14 1:52 AM		1239	BG-HD-OUT	7/15/14 1:58 AM		29.9	1,209.10						
	6.91		BG-HD-IN	7/15/14 2:08 AM		156.9	BG-HD-OUT	7/15/14 2:00 AM		25.4	131.50						
								7/15/14 2:19 AM		6.24	(6.24)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		6.8	BG-HD-OUT	7/21/14 4:50 AM		6.24	0.56	8.16	8.5	6.24	6.5	2.00	24%
	6.14		BG-HD-IN	7/21/14 5:05 AM		9.7	BG-HD-OUT	7/21/14 5:05 AM		6.24	3.46						
	4.35		BG-HD-IN	7/21/14 5:20 AM		6.24	BG-HD-OUT	7/21/14 5:20 AM		6.24	-						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		11.3	BG-HD-OUT	7/22/14 2:04 AM		6.24	5.06	4.63	5.7	4.04	5.0	0.72	13%
	8.08		BG-HD-IN	7/22/14 2:20 AM		6.24	BG-HD-OUT	7/22/14 2:20 AM		6.24	-						
	5.36		BG-HD-IN	7/22/14 2:35 AM			BG-HD-OUT	7/22/14 2:35 AM			-						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		1070	BG-HD-OUT	7/23/14 6:26 PM		320.4	749.60	566.14	123.8	165.71	36.2	87.60	71%
	18.15		BG-HD-IN	7/23/14 6:35 PM			BG-HD-OUT	7/23/14 6:36 PM		6.24	(6.24)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM			-						
	6.94		BG-HD-IN	7/23/14 7:14 PM		164.5	BG-HD-OUT	7/23/14 7:13 PM			164.50						
	2.30		BG-HD-IN	7/23/14 7:29 PM		6.24	BG-HD-OUT	7/23/14 7:14 PM			6.24						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM			-						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		669	BG-HD-OUT	8/12/2014 21:09		171	498.00	800.22	3576.3	153.33	685.3	2891.0	81%
	14.04		BG-HD-IN	8/12/2014 21:14		1471	BG-HD-OUT	8/12/2014 21:17		238	1,233.00						
	16.74		BG-HD-IN	8/12/2014 21:19		1557	BG-HD-OUT	8/12/2014 21:21		164	1,393.00						
	20.22		BG-HD-IN	8/12/2014 21:35		262	BG-HD-OUT	8/12/2014 21:42		193	69.00						
	25.17		BG-HD-IN	8/12/2014 21:44		245	BG-HD-OUT	8/12/2014 21:46		177	68.00						
	20.21		BG-HD-IN	8/12/2014 21:47		996	BG-HD-OUT	8/12/2014 21:54		174	822.00						
	12.42		BG-HD-IN	8/12/2014 22:05			BG-HD-OUT	8/12/2014 21:56		41	(41.00)						
	5.33		BG-HD-IN	8/12/2014 22:12			BG-HD-OUT	8/12/2014 22:12		6	(6.00)						

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Minimum Percentage Difference	**0%**
Average Percentage Difference	**76%**
Maximum Percentage Difference	**100%**

Table 9 - Arsenic TR Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Concentration Difference (µg/L)	Event Mean Concentration In (µg/L)	Loading In (lbs)	Event Mean Concentration Out (µg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	12.2	BG-HD-OUT	6/1/14 1:53 AM	0	14.6	(2.40)	11.47	0.002	15.03	0.003	(0.00)	-31%
	0.92		BG-HD-IN	6/1/14 1:59 AM	7	10.8	BG-HD-OUT	6/1/14 2:02 AM	9	15.9	(5.10)						
	1.16		BG-HD-IN	6/1/14 2:01 AM	9	11.1	BG-HD-OUT	6/1/14 2:05 AM	12	15	(3.90)						
	0.97		BG-HD-IN	6/1/14 2:03 AM	11	11.6	BG-HD-OUT	6/1/14 2:08 AM	15	14.8	(3.20)						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		11.6	BG-HD-OUT	6/1/14 1:57 PM		14.6	(3.00)	10.83	0.000	14.77	0.000	(0.00)	-36%
	1.11		BG-HD-IN	6/1/14 2:12 PM		9.84	BG-HD-OUT	6/1/14 2:13 PM		15	(5.16)						
Storm Water - Jun 13, 2014 #1	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		39.7	BG-HD-OUT	6/13/14 5:09 AM		66.7	(27.00)	36.96	0.002	75.52	0.004	(0.00)	-104%
	1.92		BG-HD-IN	6/13/14 5:25 AM		33.4	BG-HD-OUT	6/13/14 5:24 AM		87	(53.60)						
Storm Water - Jun 15, 2014	2.04	206571	BG-HD-IN	6/15/14 8:35 PM	0	21.6	BG-HD-OUT	6/15/14 8:33 PM	0	14.4	7.20	33.17	0.057	17.12	0.029	0.03	48%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	35.2	BG-HD-OUT	6/15/14 8:48 PM	15	17.1	18.10						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	35.7	BG-HD-OUT	6/15/14 9:03 PM	30	18	17.70						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	11.4	BG-HD-OUT	6/16/14 8:15 PM	0	12.3	(0.90)	9.25	0.011	9.03	0.011	0.00	2%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	10.1	BG-HD-OUT	6/16/14 8:30 PM	15	10	0.10						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	8.81	BG-HD-OUT	6/16/14 8:45 PM	30	7.59	1.22						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	7.58	BG-HD-OUT	6/16/14 9:15 PM	60	7.32	0.26						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	8.56	BG-HD-OUT	6/16/14 9:45 PM	90	7.71	0.85						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		43.5	BG-HD-OUT	6/20/14 11:45 AM		16.2	27.30	40.35	0.011	13.35	0.004	0.01	67%
	0.62		BG-HD-IN	6/20/14 12:01 PM		25.6	BG-HD-OUT	6/20/14 12:00 PM		34	(8.40)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	81.9	BG-HD-OUT	6/20/14 4:22 PM	0	43.1	38.80	42.86	0.094	83.73	0.184	(0.09)	-95%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	34.2	BG-HD-OUT	6/20/14 4:29 PM	7	91.6	(57.40)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	28.7	BG-HD-OUT	6/20/14 4:33 PM	11	105	(76.30)						
	2.51		BG-HD-IN	6/20/14 4:51 PM	28	50.2	BG-HD-OUT	6/20/14 4:51 PM	29	34.9	15.30						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	19.3	BG-HD-OUT	6/24/14 4:21 PM	0	15.1	4.20	17.57	0.029	23.08	0.037	(0.01)	-31%
	14.12		BG-HD-IN	6/24/14 5:52 PM	90	18.2	BG-HD-OUT	6/24/14 5:51 PM	90	10.7	7.50						
	13.81		BG-HD-IN	6/24/14 6:00 PM	98	12.7	BG-HD-OUT	6/24/14 6:02 PM	101	36	(23.30)						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	15.5	BG-HD-OUT	6/24/14 6:18 PM	117	26.7	(11.20)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526	9.69	BG-HD-OUT	6/25/14 1:06 AM	525	8.54	1.15						
Storm Water - Jun 26, 2014 #1	22.89	286370	BG-HD-IN	6/26/14 11:51 AM	0	23.2	BG-HD-OUT	6/26/14 11:49 AM	0	19.8	3.40	21.96	0.052	30.44	0.072	(0.02)	-39%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	16.9	BG-HD-OUT	6/26/14 12:00 PM	11	65.6	(48.70)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	25.4	BG-HD-OUT	6/26/14 12:15 PM	26	42.5	(17.10)						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM		20	BG-HD-OUT	6/26/14 3:56 PM		35.2	(15.20)	16.95	0.008	5.35	0.002	0.01	68%
	8.10		BG-HD-IN	6/26/14 5:15 PM		16.4	BG-HD-OUT	6/26/14 5:14 PM		20.8	(4.40)						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		16.8	BG-HD-OUT	7/14/14 11:13 PM		35.9	(19.10)	15.88	0.045	36.71	0.104	(0.06)	-131%
	3.60		BG-HD-IN	7/14/14 11:24 PM		14.7	BG-HD-OUT	7/14/14 11:28 PM		20.6	(5.90)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		15.8	BG-HD-OUT	7/15/14 1:31 AM		11.1	4.70						
	2.35		BG-HD-IN	7/15/14 1:31 AM		11	BG-HD-OUT	7/15/14 1:47 AM		13.3	(2.30)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		9.38	BG-HD-OUT	7/15/14 1:55 AM		44.4	(35.02)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		15.2	BG-HD-OUT	7/15/14 1:58 AM		42.9	(27.70)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		23.8	BG-HD-OUT	7/15/14 2:00 AM		38.7	(14.90)						
								7/15/14 2:19 AM		23.6	(23.60)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		10.2	BG-HD-OUT	7/21/14 4:50 AM		14.7	(4.50)	7.27	0.008	9.04	0.009	(0.00)	-24%
	6.14		BG-HD-IN	7/21/14 5:05 AM		8.26	BG-HD-OUT	7/21/14 5:05 AM		9.72	(1.46)						
	4.35		BG-HD-IN	7/21/14 5:20 AM		5.33	BG-HD-OUT	7/21/14 5:20 AM		7.02	(1.69)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		10.5	BG-HD-OUT	7/22/14 2:04 AM		10	0.50	8.29	0.010	8.17	0.010	0.00	1%
	8.08		BG-HD-IN	7/22/14 2:20 AM		8.11	BG-HD-OUT	7/22/14 2:20 AM		8.13	(0.02)						
	5.36		BG-HD-IN	7/22/14 2:35 AM		7.82	BG-HD-OUT	7/22/14 2:35 AM		7.64	0.18						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		56.7	BG-HD-OUT	7/23/14 6:26 PM		41.9	14.80	43.65	0.010	58.38	0.013	(0.00)	-34%
	18.15		BG-HD-IN	7/23/14 6:35 PM		27.6	BG-HD-OUT	7/23/14 6:36 PM		87.7	(60.10)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM		77.6	(77.60)						
	6.94		BG-HD-IN	7/23/14 7:14 PM		48.3	BG-HD-OUT	7/23/14 7:13 PM		61.3	(13.00)						
	2.30		BG-HD-IN	7/23/14 7:29 PM		25.6	BG-HD-OUT	7/23/14 7:14 PM		21.6	4.00						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM		25.2	(25.20)						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		54.4	BG-HD-OUT	8/12/2014 21:09		25.8	28.60	20.03	0.090	41.60	0.186	(0.10)	-108%
	14.04		BG-HD-IN	8/12/2014 21:14		13.8	BG-HD-OUT	8/12/2014 21:17		49.8	(36.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		17.3	BG-HD-OUT	8/12/2014 21:21		40.2	(22.90)						
	20.22		BG-HD-IN	8/12/2014 21:35		15.3	BG-HD-OUT	8/12/2014 21:42		48.5	(33.20)						
	25.17		BG-HD-IN	8/12/2014 21:44		17.3	BG-HD-OUT	8/12/2014 21:46		57.7	(40.40)						
	20.21		BG-HD-IN	8/12/2014 21:47		17.1	BG-HD-OUT	8/12/2014 21:54		31.3	(14.20)						
	12.42		BG-HD-IN	8/12/2014 22:05		23.8	BG-HD-OUT	8/12/2014 21:56		18.6	5.20						
	5.33		BG-HD-IN				BG-HD-OUT	8/12/2014 22:12		10	(10.00)						

Minimum Percentage Difference	**-104%**
Average Percentage Difference	**-15%**
Maximum Percentage Difference	**68%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 11 - CopperTR Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Concentration Difference (µg/L)	Event Mean Concentration In (µg/L)	Loading In (lbs)	Event Mean Concentration Out (µg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	57.4	BG-HD-OUT	6/1/14 1:53 AM	0	157	(99.60)	77.79	0.014	183.05	0.034	(0.02)	-135%
	0.92		BG-HD-IN	6/1/14 1:59 AM	7	77.9	BG-HD-OUT	6/1/14 2:02 AM	9	196	(118.10)						
	1.16		BG-HD-IN	6/1/14 2:01 AM	9	73.4	BG-HD-OUT	6/1/14 2:05 AM	12	199	(125.60)						
	0.97		BG-HD-IN	6/1/14 2:03 AM	11	109	BG-HD-OUT	6/1/14 2:08 AM	15	185	(76.00)						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		77.2	BG-HD-OUT	6/1/14 1:57 PM		173	(95.80)	82.05	0.002	182.60	0.005	(0.00)	-123%
	1.11		BG-HD-IN	6/1/14 2:12 PM		88.3	BG-HD-OUT	6/1/14 2:13 PM		195	(106.70)						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		200	BG-HD-OUT	6/13/14 5:09 AM		798	(598.00)	178.70	0.009	1,046.64	0.054	(0.04)	-486%
	1.92		BG-HD-IN	6/13/14 5:25 AM		151	BG-HD-OUT	6/13/14 5:24 AM		1370	(1,219.00)						
Storm Water - Jun 15, 2014	2.04	206571	BG-HD-IN	6/15/14 8:35 PM	0	129	BG-HD-OUT	6/15/14 8:33 PM	0	137	(8.00)	335.15	0.574	203.19	0.348	0.23	39%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	459	BG-HD-OUT	6/15/14 8:48 PM	15	192	267.00						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	329	BG-HD-OUT	6/15/14 9:03 PM	30	231	98.00						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	138	BG-HD-OUT	6/16/14 8:15 PM	0	128	10.00	101.88	0.122	97.50	0.117	0.01	4%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	106	BG-HD-OUT	6/16/14 8:30 PM	15	107	(1.00)						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	90.7	BG-HD-OUT	6/16/14 8:45 PM	30	88.4	2.30						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	87.5	BG-HD-OUT	6/16/14 9:15 PM	60	79.1	8.40						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	82.6	BG-HD-OUT	6/16/14 9:45 PM	90	84.3	(1.70)						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		710	BG-HD-OUT	6/20/14 11:45 AM		318	392.00	624.68	0.166	262.06	0.070	0.10	58%
	0.62		BG-HD-IN	6/20/14 12:01 PM		225	BG-HD-OUT	6/20/14 12:00 PM		420	(195.00)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	925	BG-HD-OUT	6/20/14 4:22 PM	0	508	417.00	419.14	0.919	863.92	1.893	(0.97)	-106%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	343	BG-HD-OUT	6/20/14 4:29 PM	7	952	(609.00)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	206	BG-HD-OUT	6/20/14 4:33 PM	11	1030	(824.00)						
	2.51		BG-HD-IN	6/20/14 4:51 PM	28	397	BG-HD-OUT	6/20/14 4:51 PM	29	411	(14.00)						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	197	BG-HD-OUT	6/24/14 4:21 PM	0	166	31.00	137.40	0.223	228.54	0.371	(0.15)	-66%
	14.12		BG-HD-IN	6/24/14 5:52 PM	90	177	BG-HD-OUT	6/24/14 5:51 PM	90	108	69.00						
	13.81		BG-HD-IN	6/24/14 6:00 PM	98	110	BG-HD-OUT	6/24/14 6:02 PM	101	362	(252.00)						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	89.3	BG-HD-OUT	6/24/14 6:18 PM	117	191	(101.70)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526	35.1	BG-HD-OUT	6/25/14 1:06 AM	525	58.5	(23.40)						
Storm Water - Jun 26, 2014 #1	22.89	286370	BG-HD-IN	6/26/14 11:51 AM	0	167	BG-HD-OUT	6/26/14 11:49 AM	0	199	(32.00)	154.54	0.367	306.60	0.728	(0.36)	-98%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	108	BG-HD-OUT	6/26/14 12:00 PM	11	681	(573.00)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	168	BG-HD-OUT	6/26/14 12:15 PM	26	331	(163.00)						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM		124	BG-HD-OUT	6/26/14 3:56 PM		264	(140.00)	150.29	0.070	40.10	0.019	0.05	73%
	8.10		BG-HD-IN	6/26/14 5:15 PM		155	BG-HD-OUT	6/26/14 5:14 PM		169	(14.00)						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		198	BG-HD-OUT	7/14/14 11:13 PM		481	(283.00)	140.27	0.397	358.52	1.015	(0.62)	-156%
	3.60		BG-HD-IN	7/14/14 11:24 PM		158	BG-HD-OUT	7/14/14 11:28 PM		224	(66.00)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		140	BG-HD-OUT	7/15/14 1:31 AM		131	9.00						
	2.35		BG-HD-IN	7/15/14 1:31 AM		97	BG-HD-OUT	7/15/14 1:47 AM		157	(60.00)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		97.2	BG-HD-OUT	7/15/14 1:55 AM		476	(378.80)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		115	BG-HD-OUT	7/15/14 1:58 AM		412	(297.00)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		186	BG-HD-OUT	7/15/14 2:00 AM		359	(173.00)						
	2.89							7/15/14 2:19 AM		192	(192.00)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		137	BG-HD-OUT	7/21/14 4:50 AM		164	(27.00)	91.64	0.095	97.66	0.102	(0.01)	-7%
	6.14		BG-HD-IN	7/21/14 5:05 AM		98	BG-HD-OUT	7/21/14 5:05 AM		103	(5.00)						
	4.35		BG-HD-IN	7/21/14 5:20 AM		74.1	BG-HD-OUT	7/21/14 5:20 AM		77.6	(3.50)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		116	BG-HD-OUT	7/22/14 2:04 AM		92.1	23.90	82.94	0.102	76.09	0.094	0.01	8%
	8.08		BG-HD-IN	7/22/14 2:20 AM		78.4	BG-HD-OUT	7/22/14 2:20 AM		75.7	2.70						
	5.36		BG-HD-IN	7/22/14 2:35 AM		78.9	BG-HD-OUT	7/22/14 2:35 AM		71.4	7.50						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		546	BG-HD-OUT	7/23/14 6:26 PM		416	130.00	350.15	0.077	492.52	0.108	(0.03)	-41%
	18.15		BG-HD-IN	7/23/14 6:35 PM		214	BG-HD-OUT	7/23/14 6:36 PM		703	(489.00)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM		557	(557.00)						
	6.94		BG-HD-IN	7/23/14 7:14 PM		365	BG-HD-OUT	7/23/14 7:13 PM		383	(18.00)						
	2.30		BG-HD-IN	7/23/14 7:29 PM		177	BG-HD-OUT	7/23/14 7:14 PM		202	(25.00)						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM		222	(222.00)						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		698	BG-HD-OUT	8/12/2014 21:09		350	348.00	185.17	0.828	425.73	1.903	(1.08)	-130%
	14.04		BG-HD-IN	8/12/2014 21:14		154	BG-HD-OUT	8/12/2014 21:17		564	(410.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		142	BG-HD-OUT	8/12/2014 21:21		465	(323.00)						
	20.22		BG-HD-IN	8/12/2014 21:35		109	BG-HD-OUT	8/12/2014 21:42		509	(400.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		139	BG-HD-OUT	8/12/2014 21:46		528	(389.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		127	BG-HD-OUT	8/12/2014 21:54		283	(156.00)						
	12.42		BG-HD-IN	8/12/2014 22:05		218	BG-HD-OUT	8/12/2014 21:56		161	57.00						
	5.33		BG-HD-IN				BG-HD-OUT	8/12/2014 22:12		87	(87.00)						
						193.84				319.44			3.96		6.9	**ge Difference**	**-486%**
			Sample for "OUT" but no sample for "IN"													**Average Percentage Difference**	**-74%**
			Sample occurred out of the time of the storm													**Maximum Percentage Difference**	**73%**

Table 11 - CopperTR Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Concentration Difference (µg/L)	Event Mean Concentration In (µg/L)	Loading In (lbs)	Event Mean Concentration Out (µg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	57.4	BG-HD-OUT	6/1/14 1:53 AM	0	157	(99.60)	77.79	0.014	183.05	0.034	(0.02)	-135%
	0.92		BG-HD-IN	6/1/14 1:59 AM	7	77.9	BG-HD-OUT	6/1/14 2:02 AM	9	196	(118.10)						
	1.16		BG-HD-IN	6/1/14 2:01 AM	9	73.4	BG-HD-OUT	6/1/14 2:05 AM	12	199	(125.60)						
	0.97		BG-HD-IN	6/1/14 2:03 AM	11	109	BG-HD-OUT	6/1/14 2:08 AM	15	185	(76.00)						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		77.2	BG-HD-OUT	6/1/14 1:57 PM		173	(95.80)	82.05	0.002	182.60	0.005	(0.00)	-123%
	1.11		BG-HD-IN	6/1/14 2:12 PM		88.3	BG-HD-OUT	6/1/14 2:13 PM		195	(106.70)						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		200	BG-HD-OUT	6/13/14 5:09 AM		798	(598.00)	178.70	0.009	1,046.64	0.054	(0.04)	-486%
	1.92		BG-HD-IN	6/13/14 5:25 AM		151	BG-HD-OUT	6/13/14 5:24 AM		1370	(1,219.00)						
Storm Water - Jun 15, 2014	2.04	206571	BG-HD-IN	6/15/14 8:35 PM	0	129	BG-HD-OUT	6/15/14 8:33 PM	0	137	(8.00)	335.15	0.574	203.19	0.348	0.23	39%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	459	BG-HD-OUT	6/15/14 8:48 PM	15	192	267.00						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	329	BG-HD-OUT	6/15/14 9:03 PM	30	231	98.00						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	138	BG-HD-OUT	6/16/14 8:15 PM	0	128	10.00	101.88	0.122	97.50	0.117	0.01	4%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	106	BG-HD-OUT	6/16/14 8:30 PM	15	107	(1.00)						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	90.7	BG-HD-OUT	6/16/14 8:45 PM	30	88.4	2.30						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	87.5	BG-HD-OUT	6/16/14 9:15 PM	60	79.1	8.40						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	82.6	BG-HD-OUT	6/16/14 9:45 PM	90	84.3	(1.70)						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		710	BG-HD-OUT	6/20/14 11:45 AM		318	392.00	624.68	0.166	262.06	0.070	0.10	58%
	0.62		BG-HD-IN	6/20/14 12:01 PM		225	BG-HD-OUT	6/20/14 12:00 PM		420	(195.00)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	925	BG-HD-OUT	6/20/14 4:22 PM	0	508	417.00	419.14	0.919	863.92	1.893	(0.97)	-106%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	343	BG-HD-OUT	6/20/14 4:29 PM	7	952	(609.00)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	206	BG-HD-OUT	6/20/14 4:33 PM	11	1030	(824.00)						
	2.51		BG-HD-IN	6/20/14 4:51 PM	28	397	BG-HD-OUT	6/20/14 4:51 PM	29	411	(14.00)						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	197	BG-HD-OUT	6/24/14 4:21 PM	0	166	31.00	137.40	0.223	228.54	0.371	(0.15)	-66%
	14.12		BG-HD-IN	6/24/14 5:52 PM	90	177	BG-HD-OUT	6/24/14 5:51 PM	90	108	69.00						
	13.81		BG-HD-IN	6/24/14 6:00 PM	98	110	BG-HD-OUT	6/24/14 6:02 PM	101	362	(252.00)						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	89.3	BG-HD-OUT	6/24/14 6:18 PM	117	191	(101.70)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526	35.1	BG-HD-OUT	6/25/14 1:06 AM	525	58.5	(23.40)						
Storm Water - Jun 26, 2014 #1	22.89	286370	BG-HD-IN	6/26/14 11:51 AM	0	167	BG-HD-OUT	6/26/14 11:49 AM	0	199	(32.00)	154.54	0.367	306.60	0.728	(0.36)	-98%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	108	BG-HD-OUT	6/26/14 12:00 PM	11	681	(573.00)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	168	BG-HD-OUT	6/26/14 12:15 PM	26	331	(163.00)						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM		124	BG-HD-OUT	6/26/14 3:56 PM		264	(140.00)	150.29	0.070	40.10	0.019	0.05	73%
	8.10		BG-HD-IN	6/26/14 5:15 PM		155	BG-HD-OUT	6/26/14 5:14 PM		169	(14.00)						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		198	BG-HD-OUT	7/14/14 11:13 PM		481	(283.00)	140.27	0.397	358.52	1.015	(0.62)	-156%
	3.60		BG-HD-IN	7/14/14 11:24 PM		158	BG-HD-OUT	7/14/14 11:28 PM		224	(66.00)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		140	BG-HD-OUT	7/15/14 1:31 AM		131	9.00						
	2.35		BG-HD-IN	7/15/14 1:31 AM		97	BG-HD-OUT	7/15/14 1:47 AM		157	(60.00)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		97.2	BG-HD-OUT	7/15/14 1:55 AM		476	(378.80)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		115	BG-HD-OUT	7/15/14 1:58 AM		412	(297.00)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		186	BG-HD-OUT	7/15/14 2:00 AM		359	(173.00)						
	2.89							7/15/14 2:19 AM		192	(192.00)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		137	BG-HD-OUT	7/21/14 4:50 AM		164	(27.00)	91.64	0.095	97.66	0.102	(0.01)	-7%
	6.14		BG-HD-IN	7/21/14 5:05 AM		98	BG-HD-OUT	7/21/14 5:05 AM		103	(5.00)						
	4.35		BG-HD-IN	7/21/14 5:20 AM		74.1	BG-HD-OUT	7/21/14 5:20 AM		77.6	(3.50)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		116	BG-HD-OUT	7/22/14 2:04 AM		92.1	23.90	82.94	0.102	76.09	0.094	0.01	8%
	8.08		BG-HD-IN	7/22/14 2:20 AM		78.4	BG-HD-OUT	7/22/14 2:20 AM		75.7	2.70						
	5.36		BG-HD-IN	7/22/14 2:35 AM		78.9	BG-HD-OUT	7/22/14 2:35 AM		71.4	7.50						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		546	BG-HD-OUT	7/23/14 6:26 PM		416	130.00	350.15	0.077	492.52	0.108	(0.03)	-41%
	18.15		BG-HD-IN	7/23/14 6:35 PM		214	BG-HD-OUT	7/23/14 6:36 PM		703	(489.00)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM		557	(557.00)						
	6.94		BG-HD-IN	7/23/14 7:14 PM		365	BG-HD-OUT	7/23/14 7:13 PM		383	(18.00)						
	2.30		BG-HD-IN	7/23/14 7:29 PM		177	BG-HD-OUT	7/23/14 7:14 PM		202	(25.00)						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM		222	(222.00)						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		698	BG-HD-OUT	8/12/2014 21:09		350	348.00	185.17	0.828	425.73	1.903	(1.08)	-130%
	14.04		BG-HD-IN	8/12/2014 21:14		154	BG-HD-OUT	8/12/2014 21:17		564	(410.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		142	BG-HD-OUT	8/12/2014 21:21		465	(323.00)						
	20.22		BG-HD-IN	8/12/2014 21:35		109	BG-HD-OUT	8/12/2014 21:42		509	(400.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		139	BG-HD-OUT	8/12/2014 21:46		528	(389.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		127	BG-HD-OUT	8/12/2014 21:54		283	(156.00)						
	12.42		BG-HD-IN	8/12/2014 22:05		218	BG-HD-OUT	8/12/2014 21:56		161	57.00						
	5.33		BG-HD-IN				BG-HD-OUT	8/12/2014 22:12		87	(87.00)						
						193.84				319.44			3.96		6.9	**ge Difference**	**-486%**
			Sample for "OUT" but no sample for "IN"													**Average Percentage Difference**	**-74%**
			Sample occurred out of the time of the storm													**Maximum Percentage Difference**	**73%**

Table 11 - CopperTR Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Concentration Difference (µg/L)	Event Mean Concentration In (µg/L)	Loading In (lbs)	Event Mean Concentration Out (µg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	57.4	BG-HD-OUT	6/1/14 1:53 AM	0	157	(99.60)	77.79	0.014	183.05	0.034	(0.02)	-135%
	0.92		BG-HD-IN	6/1/14 1:59 AM	7	77.9	BG-HD-OUT	6/1/14 2:02 AM	9	196	(118.10)						
	1.16		BG-HD-IN	6/1/14 2:01 AM	9	73.4	BG-HD-OUT	6/1/14 2:05 AM	12	199	(125.60)						
	0.97		BG-HD-IN	6/1/14 2:03 AM	11	109	BG-HD-OUT	6/1/14 2:08 AM	15	185	(76.00)						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		77.2	BG-HD-OUT	6/1/14 1:57 PM		173	(95.80)	82.05	0.002	182.60	0.005	(0.00)	-123%
	1.11		BG-HD-IN	6/1/14 2:12 PM		88.3	BG-HD-OUT	6/1/14 2:13 PM		195	(106.70)						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		200	BG-HD-OUT	6/13/14 5:09 AM		798	(598.00)	178.70	0.009	1,046.64	0.054	(0.04)	-486%
	1.92		BG-HD-IN	6/13/14 5:25 AM		151	BG-HD-OUT	6/13/14 5:24 AM		1370	(1,219.00)						
Storm Water - Jun 15, 2014	2.04	206571	BG-HD-IN	6/15/14 8:35 PM	0	129	BG-HD-OUT	6/15/14 8:33 PM	0	137	(8.00)	335.15	0.574	203.19	0.348	0.23	39%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	459	BG-HD-OUT	6/15/14 8:48 PM	15	192	267.00						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	329	BG-HD-OUT	6/15/14 9:03 PM	30	231	98.00						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	138	BG-HD-OUT	6/16/14 8:15 PM	0	128	10.00	101.88	0.122	97.50	0.117	0.01	4%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	106	BG-HD-OUT	6/16/14 8:30 PM	15	107	(1.00)						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	90.7	BG-HD-OUT	6/16/14 8:45 PM	30	88.4	2.30						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	87.5	BG-HD-OUT	6/16/14 9:15 PM	60	79.1	8.40						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	82.6	BG-HD-OUT	6/16/14 9:45 PM	90	84.3	(1.70)						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		710	BG-HD-OUT	6/20/14 11:45 AM		318	392.00	624.68	0.166	262.06	0.070	0.10	58%
	0.62		BG-HD-IN	6/20/14 12:01 PM		225	BG-HD-OUT	6/20/14 12:00 PM		420	(195.00)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	925	BG-HD-OUT	6/20/14 4:22 PM	0	508	417.00	419.14	0.919	863.92	1.893	(0.97)	-106%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	343	BG-HD-OUT	6/20/14 4:29 PM	7	952	(609.00)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	206	BG-HD-OUT	6/20/14 4:33 PM	11	1030	(824.00)						
	2.51		BG-HD-IN	6/20/14 4:51 PM	28	397	BG-HD-OUT	6/20/14 4:51 PM	29	411	(14.00)						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	197	BG-HD-OUT	6/24/14 4:21 PM	0	166	31.00	137.40	0.223	228.54	0.371	(0.15)	-66%
	14.12		BG-HD-IN	6/24/14 5:52 PM	90	177	BG-HD-OUT	6/24/14 5:51 PM	90	108	69.00						
	13.81		BG-HD-IN	6/24/14 6:00 PM	98	110	BG-HD-OUT	6/24/14 6:02 PM	101	362	(252.00)						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	89.3	BG-HD-OUT	6/24/14 6:18 PM	117	191	(101.70)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526	35.1	BG-HD-OUT	6/25/14 1:06 AM	525	58.5	(23.40)						
Storm Water - Jun 26, 2014 #1	22.89	286370	BG-HD-IN	6/26/14 11:51 AM	0	167	BG-HD-OUT	6/26/14 11:49 AM	0	199	(32.00)	154.54	0.367	306.60	0.728	(0.36)	-98%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	108	BG-HD-OUT	6/26/14 12:00 PM	11	681	(573.00)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	168	BG-HD-OUT	6/26/14 12:15 PM	26	331	(163.00)						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM		124	BG-HD-OUT	6/26/14 3:56 PM		264	(140.00)	150.29	0.070	40.10	0.019	0.05	73%
	8.10		BG-HD-IN	6/26/14 5:15 PM		155	BG-HD-OUT	6/26/14 5:14 PM		169	(14.00)						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		198	BG-HD-OUT	7/14/14 11:13 PM		481	(283.00)	140.27	0.397	358.52	1.015	(0.62)	-156%
	3.60		BG-HD-IN	7/14/14 11:24 PM		158	BG-HD-OUT	7/14/14 11:28 PM		224	(66.00)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		140	BG-HD-OUT	7/15/14 1:31 AM		131	9.00						
	2.35		BG-HD-IN	7/15/14 1:31 AM		97	BG-HD-OUT	7/15/14 1:47 AM		157	(60.00)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		97.2	BG-HD-OUT	7/15/14 1:55 AM		476	(378.80)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		115	BG-HD-OUT	7/15/14 1:58 AM		412	(297.00)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		186	BG-HD-OUT	7/15/14 2:00 AM		359	(173.00)						
	2.89							7/15/14 2:19 AM		192	(192.00)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		137	BG-HD-OUT	7/21/14 4:50 AM		164	(27.00)	91.64	0.095	97.66	0.102	(0.01)	-7%
	6.14		BG-HD-IN	7/21/14 5:05 AM		98	BG-HD-OUT	7/21/14 5:05 AM		103	(5.00)						
	4.35		BG-HD-IN	7/21/14 5:20 AM		74.1	BG-HD-OUT	7/21/14 5:20 AM		77.6	(3.50)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		116	BG-HD-OUT	7/22/14 2:04 AM		92.1	23.90	82.94	0.102	76.09	0.094	0.01	8%
	8.08		BG-HD-IN	7/22/14 2:20 AM		78.4	BG-HD-OUT	7/22/14 2:20 AM		75.7	2.70						
	5.36		BG-HD-IN	7/22/14 2:35 AM		78.9	BG-HD-OUT	7/22/14 2:35 AM		71.4	7.50						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		546	BG-HD-OUT	7/23/14 6:26 PM		416	130.00	350.15	0.077	492.52	0.108	(0.03)	-41%
	18.15		BG-HD-IN	7/23/14 6:35 PM		214	BG-HD-OUT	7/23/14 6:36 PM		703	(489.00)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM		557	(557.00)						
	6.94		BG-HD-IN	7/23/14 7:14 PM		365	BG-HD-OUT	7/23/14 7:13 PM		383	(18.00)						
	2.30		BG-HD-IN	7/23/14 7:29 PM		177	BG-HD-OUT	7/23/14 7:14 PM		202	(25.00)						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM		222	(222.00)						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		698	BG-HD-OUT	8/12/2014 21:09		350	348.00	185.17	0.828	425.73	1.903	(1.08)	-130%
	14.04		BG-HD-IN	8/12/2014 21:14		154	BG-HD-OUT	8/12/2014 21:17		564	(410.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		142	BG-HD-OUT	8/12/2014 21:21		465	(323.00)						
	20.22		BG-HD-IN	8/12/2014 21:35		109	BG-HD-OUT	8/12/2014 21:42		509	(400.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		139	BG-HD-OUT	8/12/2014 21:46		528	(389.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		127	BG-HD-OUT	8/12/2014 21:54		283	(156.00)						
	12.42		BG-HD-IN	8/12/2014 22:05		218	BG-HD-OUT	8/12/2014 21:56		161	57.00						
	5.33		BG-HD-IN				BG-HD-OUT	8/12/2014 22:12		87	(87.00)						
						193.84				319.44			3.96		6.9	**ge Difference**	**-486%**
			Sample for "OUT" but no sample for "IN"													**Average Percentage Difference**	**-74%**
			Sample occurred out of the time of the storm													**Maximum Percentage Difference**	**73%**

Table 12 - Lead TR Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Concentration Difference (µg/L)	Event Mean Concentration In (µg/L)	Loading In (lbs)	Event Mean Concentration Out (µg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	52.8	BG-HD-OUT	6/1/14 1:53 AM	0	103	(50.20)	48.27	0.009	136.20	0.025	(0.02)	-182%
	0.92		BG-HD-IN	6/1/14 1:59 AM	7	42.5	BG-HD-OUT	6/1/14 2:02 AM	9	144	(101.50)						
	1.16		BG-HD-IN	6/1/14 2:01 AM	9	40.1	BG-HD-OUT	6/1/14 2:05 AM	12	159	(118.90)						
	0.97		BG-HD-IN	6/1/14 2:03 AM	11	57.7	BG-HD-OUT	6/1/14 2:08 AM	15	144	(86.30)						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		61.5	BG-HD-OUT	6/1/14 1:57 PM		168	(106.50)	59.71	0.002	181.10	0.005	(0.00)	-203%
	1.11		BG-HD-IN	6/1/14 2:12 PM		57.4	BG-HD-OUT	6/1/14 2:13 PM		198	(140.60)						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		246	BG-HD-OUT	6/13/14 5:09 AM		952	(706.00)	196.88	0.010	1,085.88	0.056	(0.05)	-452%
	1.92		BG-HD-IN	6/13/14 5:25 AM		133	BG-HD-OUT	6/13/14 5:24 AM		1260	(1,127.00)						
Storm Water - Jun 15, 2014	2.04	206571	BG-HD-IN	6/15/14 8:35 PM	0	147	BG-HD-OUT	6/15/14 8:33 PM	0	115	32.00	671.18	1.149	205.63	0.352	0.80	69%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	674	BG-HD-OUT	6/15/14 8:48 PM	15	183	491.00						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	838	BG-HD-OUT	6/15/14 9:03 PM	30	248	590.00						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	152	BG-HD-OUT	6/16/14 8:15 PM	0	135	17.00	114.31	0.137	108.44	0.130	0.01	5%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	131	BG-HD-OUT	6/16/14 8:30 PM	15	127	4.00						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	108	BG-HD-OUT	6/16/14 8:45 PM	30	105	3.00						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	87.3	BG-HD-OUT	6/16/14 9:15 PM	60	85.5	1.80						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	93.8	BG-HD-OUT	6/16/14 9:45 PM	90	90.9	2.90						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		504	BG-HD-OUT	6/20/14 11:45 AM		259	245.00	466.35	0.124	213.44	0.057	0.07	54%
	0.62		BG-HD-IN	6/20/14 12:01 PM		290	BG-HD-OUT	6/20/14 12:00 PM		408	(118.00)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	1740	BG-HD-OUT	6/20/14 4:22 PM	0	922	818.00	814.43	1.785	1,492.14	3.270	(1.49)	-83%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	692	BG-HD-OUT	6/20/14 4:29 PM	7	1680	(988.00)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	400	BG-HD-OUT	6/20/14 4:33 PM	11	1730	(1,330.00)						
	2.51		BG-HD-IN	6/20/14 4:51 PM	28	805	BG-HD-OUT	6/20/14 4:51 PM	29	534	271.00						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	180	BG-HD-OUT	6/24/14 4:21 PM	0	133	47.00	174.80	0.284	321.91	0.523	(0.24)	-84%
	14.12		BG-HD-IN	6/24/14 5:52 PM	90	220	BG-HD-OUT	6/24/14 5:51 PM	90	89.5	130.50						
	13.81		BG-HD-IN	6/24/14 6:00 PM	98	134	BG-HD-OUT	6/24/14 6:02 PM	101	556	(422.00)						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	155	BG-HD-OUT	6/24/14 6:18 PM	117	335	(180.00)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526	20.1	BG-HD-OUT	6/25/14 1:06 AM	525	66.8	(46.70)						
Storm Water - Jun 26, 2014 #1	22.89	286370	BG-HD-IN	6/26/14 11:51 AM	0	242	BG-HD-OUT	6/26/14 11:49 AM	0	196	46.00	234.43	0.557	399.51	0.948	(0.39)	-70%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	193	BG-HD-OUT	6/26/14 12:00 PM	11	1080	(887.00)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	310	BG-HD-OUT	6/26/14 12:15 PM	26	587	(277.00)						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM		227	BG-HD-OUT	6/26/14 3:56 PM		487	(260.00)	171.87	0.080	73.97	0.034	0.05	57%
	8.10		BG-HD-IN	6/26/14 5:15 PM		162	BG-HD-OUT	6/26/14 5:14 PM		264	(102.00)						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		193	BG-HD-OUT	7/14/14 11:13 PM		483	(290.00)	188.55	0.534	528.84	1.497	(0.96)	-180%
	3.60		BG-HD-IN	7/14/14 11:24 PM		233	BG-HD-OUT	7/14/14 11:28 PM		381	(148.00)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		211	BG-HD-OUT	7/15/14 1:31 AM		119	92.00						
	2.35		BG-HD-IN	7/15/14 1:31 AM		73.4	BG-HD-OUT	7/15/14 1:47 AM		145	(71.60)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		90.3	BG-HD-OUT	7/15/14 1:55 AM		649	(558.70)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		170	BG-HD-OUT	7/15/14 1:58 AM		640	(470.00)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		311	BG-HD-OUT	7/15/14 2:00 AM		553	(242.00)						
								7/15/14 2:19 AM		335	(335.00)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		94.9	BG-HD-OUT	7/21/14 4:50 AM		87.7	7.20	81.75	0.085	86.17	0.090	(0.00)	-5%
	6.14		BG-HD-IN	7/21/14 5:05 AM		95.2	BG-HD-OUT	7/21/14 5:05 AM		98.7	(3.50)						
	4.35		BG-HD-IN	7/21/14 5:20 AM		60.3	BG-HD-OUT	7/21/14 5:20 AM		68.2	(7.90)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		99.6	BG-HD-OUT	7/22/14 2:04 AM		84.1	15.50	87.57	0.108	77.21	0.095	0.01	12%
	8.08		BG-HD-IN	7/22/14 2:20 AM		87.1	BG-HD-OUT	7/22/14 2:20 AM		79.5	7.60						
	5.36		BG-HD-IN	7/22/14 2:35 AM		84.3	BG-HD-OUT	7/22/14 2:35 AM		71.5	12.80						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		1060	BG-HD-OUT	7/23/14 6:26 PM		1080	(20.00)	750.04	0.164	1,094.97	0.240	(0.08)	-46%
	18.15		BG-HD-IN	7/23/14 6:35 PM		368	BG-HD-OUT	7/23/14 6:36 PM		1340	(972.00)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM		1130	(1,130.00)						
	6.94		BG-HD-IN	7/23/14 7:14 PM		753	BG-HD-OUT	7/23/14 7:13 PM		781	(28.00)						
	2.30		BG-HD-IN	7/23/14 7:29 PM		348	BG-HD-OUT	7/23/14 7:14 PM		275	73.00						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM		376	(376.00)						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		777	BG-HD-OUT	8/12/2014 21:09		434	343.00	291.92	1.305	583.74	2.609	(1.30)	-100%
	14.04		BG-HD-IN	8/12/2014 21:14		141	BG-HD-OUT	8/12/2014 21:17		770	(629.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		872	BG-HD-OUT	8/12/2014 21:21		583	289.00						
	20.22		BG-HD-IN	8/12/2014 21:35		101	BG-HD-OUT	8/12/2014 21:42		676	(575.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		151	BG-HD-OUT	8/12/2014 21:46		790	(639.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		66	BG-HD-OUT	8/12/2014 21:54		395	(329.00)						
	12.42		BG-HD-IN	8/12/2014 22:05		292	BG-HD-OUT	8/12/2014 21:56		222	70.00						
	5.33		BG-HD-IN				BG-HD-OUT	8/12/2014 22:12		99	(99.00)						

Minimum Percentage Difference	**-452%**
Average Percentage Difference	**-89%**
Maximum Percentage Difference	**69%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 13 - Zinc TR Capture Rates

Storm Event	Flow (cfs)	Total Volume (gal)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Location	Sample Time	Time from Start (min)	Concentration (µg/L)	Concentration Difference (µg/L)	Event Mean Concentration In (µg/L)	Loading In (lbs)	Event Mean Concentration Out (µg/L)	Loading Out (lbs)	Loading Difference (lbs)	Percentage Difference (%)
Storm Water - Jun 1, 2014 #1	1.24	22382	BG-HD-IN	6/1/14 1:52 AM	0	253	BG-HD-OUT	6/1/14 1:53 AM	0	542	(289.00)	199.88	0.037	573.75	0.106	(0.07)	-187%
	0.92		BG-HD-IN	6/1/14 1:59 AM	7	157	BG-HD-OUT	6/1/14 2:02 AM	9	610	(453.00)						
	1.16		BG-HD-IN	6/1/14 2:01 AM	9	146	BG-HD-OUT	6/1/14 2:05 AM	12	593	(447.00)						
	0.97		BG-HD-IN	6/1/14 2:03 AM	11	237	BG-HD-OUT	6/1/14 2:08 AM	15	557	(320.00)						
Storm Water - Jun 1, 2014 #2	1.43	3401	BG-HD-IN	6/1/14 1:56 PM		240	BG-HD-OUT	6/1/14 1:57 PM		604	(364.00)	233.45	0.007	629.76	0.018	(0.01)	-170%
	1.11		BG-HD-IN	6/1/14 2:12 PM		225	BG-HD-OUT	6/1/14 2:13 PM		663	(438.00)						
Storm Water - Jun 13, 2014 #2	2.50	6227	BG-HD-IN	6/13/14 5:10 AM		3070	BG-HD-OUT	6/13/14 5:09 AM		3720	(650.00)	2,926.55	0.151	4,415.49	0.228	(0.08)	-51%
	1.92		BG-HD-IN	6/13/14 5:25 AM		2740	BG-HD-OUT	6/13/14 5:24 AM		5320	(2,580.00)						
Storm Water - Jun 15, 2014	2.04	206571	BG-HD-IN	6/15/14 8:35 PM	0	964	BG-HD-OUT	6/15/14 8:33 PM	0	419	545.00	2,521.89	4.318	701.74	1.202	3.12	72%
	3.71		BG-HD-IN	6/15/14 8:50 PM	15	2800	BG-HD-OUT	6/15/14 8:48 PM	15	607	2,193.00						
	6.35		BG-HD-IN	6/15/14 9:05 PM	30	2860	BG-HD-OUT	6/15/14 9:03 PM	30	848	2,012.00						
Storm Water - Jun 16, 2014 #2	2.22	144655	BG-HD-IN	6/16/14 8:16 PM	0	484	BG-HD-OUT	6/16/14 8:15 PM	0	551	(67.00)	425.58	0.510	416.00	0.499	0.01	2%
	2.07		BG-HD-IN	6/16/14 8:31 PM	15	395	BG-HD-OUT	6/16/14 8:30 PM	15	404	(9.00)						
	1.66		BG-HD-IN	6/16/14 8:46 PM	30	345	BG-HD-OUT	6/16/14 8:45 PM	30	322	23.00						
	2.83		BG-HD-IN	6/16/14 9:16 PM	60	418	BG-HD-OUT	6/16/14 9:15 PM	60	352	66.00						
	1.53		BG-HD-IN	6/16/14 9:46 PM	90	484	BG-HD-OUT	6/16/14 9:45 PM	90	457	27.00						
Storm Water - Jun 20, 2014 #1	2.92	32042	BG-HD-IN	6/20/14 11:46 AM		3600	BG-HD-OUT	6/20/14 11:45 AM		1310	2,290.00	3,110.58	0.826	1,079.54	0.287	0.54	65%
	0.62		BG-HD-IN	6/20/14 12:01 PM		818	BG-HD-OUT	6/20/14 12:00 PM		1300	(482.00)						
Storm Water - Jun 20, 2014 #2	12.33	264379	BG-HD-IN	6/20/14 4:23 PM	0	3200	BG-HD-OUT	6/20/14 4:22 PM	0	2020	1,180.00	1,450.94	3.180	3,069.04	6.726	(3.55)	-112%
	24.65		BG-HD-IN	6/20/14 4:30 PM	7	1140	BG-HD-OUT	6/20/14 4:29 PM	7	3290	(2,150.00)						
	20.19		BG-HD-IN	6/20/14 4:35 PM	12	733	BG-HD-OUT	6/20/14 4:33 PM	11	3600	(2,867.00)						
	2.51		BG-HD-IN	6/20/14 4:51 PM	28	1690	BG-HD-OUT	6/20/14 4:51 PM	29	1780	(90.00)						
Storm Water - Jun 24, 2014	0.01	195933	BG-HD-IN	6/24/14 4:22 PM	0	540	BG-HD-OUT	6/24/14 4:21 PM	0	469	71.00	489.76	0.795	1,026.39	1.667	(0.87)	-110%
	14.12		BG-HD-IN	6/24/14 5:52 PM	90	583	BG-HD-OUT	6/24/14 5:51 PM	90	320	263.00						
	13.81		BG-HD-IN	6/24/14 6:00 PM	98	423	BG-HD-OUT	6/24/14 6:02 PM	101	1760	(1,337.00)						
	3.77		BG-HD-IN	6/24/14 6:19 PM	117	385	BG-HD-OUT	6/24/14 6:18 PM	117	985	(600.00)						
	1.19		BG-HD-IN	6/25/14 1:08 AM	526	85	BG-HD-OUT	6/25/14 1:06 AM	525	247	(162.00)						
Storm Water - Jun 26, 2014 #1	22.89	286370	BG-HD-IN	6/26/14 11:51 AM	0	607	BG-HD-OUT	6/26/14 11:49 AM	0	767	(160.00)	559.23	1.328	1,145.55	2.719	(1.39)	-105%
	6.50		BG-HD-IN	6/26/14 11:59 AM	8	371	BG-HD-OUT	6/26/14 12:00 PM	11	2420	(2,049.00)						
	1.27		BG-HD-IN	6/26/14 12:14 PM	23	661	BG-HD-OUT	6/26/14 12:15 PM	26	1450	(789.00)						
Storm Water - Jun 26, 2014 #2	1.45	55851	BG-HD-IN	6/26/14 4:02 PM		452	BG-HD-OUT	6/26/14 3:56 PM		957	(505.00)	542.75	0.251	145.36	0.067	0.18	73%
	8.10		BG-HD-IN	6/26/14 5:15 PM		559	BG-HD-OUT	6/26/14 5:14 PM		603	(44.00)						
Storm Water - Jul 14, 2014	6.91	341565	BG-HD-IN	7/14/14 11:14 PM		458	BG-HD-OUT	7/14/14 11:13 PM		1650	(1,192.00)	427.74	1.211	1,379.75	3.907	(2.70)	-223%
	3.60		BG-HD-IN	7/14/14 11:24 PM		465	BG-HD-OUT	7/14/14 11:28 PM		935	(470.00)						
	2.86		BG-HD-IN	7/14/14 11:33 PM		512	BG-HD-OUT	7/15/14 1:31 AM		466	46.00						
	2.35		BG-HD-IN	7/15/14 1:31 AM		252	BG-HD-OUT	7/15/14 1:47 AM		595	(343.00)						
	5.01		BG-HD-IN	7/15/14 1:41 AM		266	BG-HD-OUT	7/15/14 1:55 AM		1680	(1,414.00)						
	18.21		BG-HD-IN	7/15/14 1:52 AM		374	BG-HD-OUT	7/15/14 1:58 AM		1590	(1,216.00)						
	6.91		BG-HD-IN	7/15/14 2:08 AM		662	BG-HD-OUT	7/15/14 2:00 AM		1360	(698.00)						
								7/15/14 2:19 AM		729	(729.00)						
Storm Water - Jul 21, 2014	0.82	125601	BG-HD-IN	7/21/14 4:50 AM		408	BG-HD-OUT	7/21/14 4:50 AM		513	(105.00)	401.54	0.418	383.35	0.399	0.02	5%
	6.14		BG-HD-IN	7/21/14 5:05 AM		445	BG-HD-OUT	7/21/14 5:05 AM		379	66.00						
	4.35		BG-HD-IN	7/21/14 5:20 AM		339	BG-HD-OUT	7/21/14 5:20 AM		365	(26.00)						
Storm Water - Jul 22, 2014	1.77	148411	BG-HD-IN	7/22/14 2:04 AM		382	BG-HD-OUT	7/22/14 2:04 AM		322	60.00	374.90	0.461	327.13	0.402	0.06	13%
	8.08		BG-HD-IN	7/22/14 2:20 AM		364	BG-HD-OUT	7/22/14 2:20 AM		331	33.00						
	5.36		BG-HD-IN	7/22/14 2:35 AM		389	BG-HD-OUT	7/22/14 2:35 AM		323	66.00						
Storm Water - Jul 23, 2014	31.25	26389	BG-HD-IN	7/23/14 6:26 PM		2150	BG-HD-OUT	7/23/14 6:26 PM		1580	570.00	1,553.26	0.340	2,095.65	0.458	(0.12)	-35%
	18.15		BG-HD-IN	7/23/14 6:35 PM		777	BG-HD-OUT	7/23/14 6:36 PM		3110	(2,333.00)						
	2.47		BG-HD-IN	7/23/14 6:53 PM			BG-HD-OUT	7/23/14 6:52 PM		2810	(2,810.00)						
	6.94		BG-HD-IN	7/23/14 7:14 PM		1650	BG-HD-OUT	7/23/14 7:13 PM		1970	(320.00)						
	2.30		BG-HD-IN	7/23/14 7:29 PM		943	BG-HD-OUT	7/23/14 7:14 PM		711	232.00						
			BG-HD-IN				BG-HD-OUT	7/23/14 7:23 PM		813	(813.00)						
Storm Water - 8/12/ 2014	9.03	539128	BG-HD-IN	8/12/2014 21:09		3010	BG-HD-OUT	8/12/2014 21:09		1750	1,260.00	795.34	3.554	1,509.61	6.747	(3.19)	-90%
	14.04		BG-HD-IN	8/12/2014 21:14		384	BG-HD-OUT	8/12/2014 21:17		1930	(1,546.00)						
	16.74		BG-HD-IN	8/12/2014 21:19		2110	BG-HD-OUT	8/12/2014 21:21		1610	500.00						
	20.22		BG-HD-IN	8/12/2014 21:35		236	BG-HD-OUT	8/12/2014 21:42		1550	(1,314.00)						
	25.17		BG-HD-IN	8/12/2014 21:44		352	BG-HD-OUT	8/12/2014 21:46		1860	(1,508.00)						
	20.21		BG-HD-IN	8/12/2014 21:47		157	BG-HD-OUT	8/12/2014 21:54		1100	(943.00)						
	12.42		BG-HD-IN	8/12/2014 22:05		726	BG-HD-OUT	8/12/2014 21:56		615	111.00						
	5.33		BG-HD-IN				BG-HD-OUT	8/12/2014 22:12		313	(313.00)						

Minimum Percentage Difference	**-187%**
Average Percentage Difference	**-52%**
Maximum Percentage Difference	**73%**

Sample for "OUT" but no sample for "IN"

Sample occurred out of the time of the storm

Table 14 - TSS and COC Removal Efficiencies Summary with Screening Criteria

	Less than 100% full and 3 or more samples (5 events)				More the 100% full and 3 or more samples (6 events)			
	Average	Min	Max	Std. Dev.	Average	Min	Max	Std. Dev.
Copper Removal	0.9%	-40.7%	39.4%	25.8%	-89.2%	-155.6%	58.0%	71.5%
Zinc Removal	11.4%	-34.9%	72.2%	34.6%	-109.2%	-222.6%	65.3%	91.1%
Arsenic Removal	-1.2%	-33.8%	48.4%	28.5%	-54.9%	-131.1%	66.9%	66.1%
Cadmium Removal	14.4%	-16.2%	76.1%	32.1%	-113.6%	-248.5%	59.5%	91.2%
Lead Removal	7.0%	-46.0%	69.4%	37.1%	-96.0%	-182.2%	54.2%	79.0%
TSS Removal	46.8%	20.8%	95.6%	27.4%	81.4%	71.7%	88.6%	6.0%
SS (< 0.063 mm) Removal	-19.8%	-73.1%	6.2%	31.0%	-272.4%	-475.9%	-79.7%	119.4%
SS (0.063-0.25 mm) Removal	37.2%	-13.3%	78.3%	33.5%	-63.5%	-227.2%	72.5%	114.1%
SS (0.25-1.0 mm) Removal	66.9%	28.9%	98.3%	23.0%	90.1%	79.8%	97.1%	6.8%
SS (1-2 mm) Removal	59.5%	38.4%	99.6%	21.4%	94.6%	83.9%	98.6%	5.1%
SS (> 2 mm) Removal	46.5%	12.7%	99.7%	33.2%	78.6%	0.0%	100.0%	35.7%
			Average	29.8%			Average	62.4%

Notes

1) Only events with three or more samples at the inlet and outlet with the inlet and outlet times close (within 3 minutes) of each other.

Table 15 - Capture Rate Summary

Analyte	Evaluation Method A - HD In vs Out Sample Result Capture % Range		Evaluation Method B - Expanded Results (BG-CLV-01 Only) x Literature Values Capture % Range[1,4]		Evaluation Method C -Expanded Results (Average of All Sites) x Literature Values Capture % Range[1]			Evaluation Method D - Expanded Results Applied to Literature Values and Applied to 5-year Storm Event for BG-Front St. HD[2,3]		Recommended Range
	Low	High	Low	High	When at MDL, 0	When at MDL, 1/2 of MDL	When at MDL, MDL			
TSS	21%	96%	19%	50%	35%	n/a	n/a			19 -96%
Arsenic	-34%	48%	48%	83%	37%	49%	51%			0 - 51%
Cadmium	-16%	76%	41%	94%	34%	46%	51%			0 - 51%
Copper	-41%	39%	36%	42%	46%	n/a	n/a	0%	47%	0 - 47%
Lead	-46%	69%	19%	42%	33%	n/a	n/a			0 - 42%
Zinc[5]	-35%	72%	31%	67%	40%	n/a	n/a			0 -67%

Notes

1) Ranges for Methods B and C are based on 100% of design flow. See Tables 18-27, which present the capture rate at 25%, 50%, 75%, 100%, and 125% of the design flow, in which the capture rate range is better than that for 100% of design flow flor the 25% and 50% of design flow (75% and 125% of design flow capture rates are the same as the 100% capture rate per literature recommendations).

2) Evaluation Method D applies the capture efficiencies for the 25%, 50%, 75%, and 100% of design flows presented in Tables 18-27 to the 5-year, 24-hour design hydrograph at the BG-Front St. HD to calculate a flow weighted average through the first 12.2 hours of the storm (i.e. the point at which it is calculated that the HD sump becomes full of sediment). After 12.2 hours, the HD sump is calculated to be full of sediment and cature effectiveness is assumed to be zero.

3) Evaluation Method D is only applied to copper as copper becomes the representative COC. The other COCs are calculated in methods A,B, and C to provide a comparison to copper.

4) Given the high MDLs due to low sample volume for the 6/17/14 sample event at BG-CLV-01 for the 1-2 mm fraction, the high 83% and 94% high end removal rates for arsenic and cadmium are suggested to be discounted.

5) Zinc has, on average, a higher concentration on the larger grains than the other COCs, which explains the higher capture rates.

6) The worst and based cases of capture effectiveness between Methods A, B, and C are presented in blue text. It should be noted that negative values are assumed to be zero values for the purpose of providing a recommended range.

Table 16 - BG-CLV-01 Expanded Analysis Sediment Fraction Concentrations

	6/17/201																
Fraction	Sed Mass (g)	Sed % of Total	As (mg/kg)	Total As (ug)	As % of Total	Cd (mg/kg)	Total Cd (ug)	Cd % of Total	Cu (mg/kg)	Total Cu (ug)	Cu % of Total	Pb (mg/kg)	Total Pb(ug)	Pb % of Total	Zn (mg/kg)	Total Zn(ug)	Zn % of Total
<0.063 mm	3.270	90.0%	19.97	65.30	18.9%	1.57	5.12	19.4%	219.48	717.7	80.5%	363.76	1189.5	89.6%	344.95	1766.2	58.7%
<0.002 mm	*2.109*	*58.0%*	*18*	*37.96*	*11.0%*	*0.458*	*0.97*	*3.7%*	*180*	*379.6*	*42.6%*	*349*	*736.0*	*55.4%*	*359*	*757.1*	*25.2%*
0.002-0.02 mm	*0.049*	*1.4%*	*59.7*	*2.93*	*0.8%*	*10.2*	*0.50*	*1.9%*	*530*	*26.0*	*2.9%*	*922*	*45.3*	*3.4%*	*1880*	*92.3*	*3.1%*
0.02-0.05 mm	*0.588*	*16.2%*	*22.7*	*13.36*	*3.9%*	*3.46*	*2.04*	*7.7%*	*283*	*166.5*	*18.7%*	*385*	*226.5*	*17.1%*	*849*	*499.6*	*16.6%*
0.05-0.063 mm	*0.524*	*14.4%*	*21.1*	*11.05*	*3.2%*	*3.09*	*1.62*	*6.1%*	*278*	*145.5*	*16.3%*	*347*	*181.7*	*13.7%*	*797*	*417.2*	*13.9%*
0.063-1 mm	0.308	8.5%	15.2	4.68	1.4%	8.2	2.52	9.6%	196	60.3	6.8%	220	67.7	5.1%	583	179.4	6.0%
1-2 mm	0.056	1.5%	4910	274.96	79.7%	335	18.76	71.0%	2020	113.1	12.7%	1260	70.6	5.3%	19000	1064.0	35.4%
>2 mm	0.000	0.0%		0.00	0.0%		0.00	0.0%		0.0	0.0%		0.0	0.0%		0.0	0.0%
Total	3.634			344.93			26.40			891.1			1327.8			3009.67	

Notes

1) Given the low sediment mass for the 1-2 mm fraction, the Method Detection Limits (MDL) for arsenic and cadmium were high. The values reported are the MDL values.

	8/12/2014																
Fraction	Sed Mass (g)	Sed % of Total	As (mg/kg)	Total As (ug)	As % of Total	Cd (mg/kg)	Total Cd (ug)	Cd % of Total	Cu (mg/kg)	Total Cu (ug)	Cu % of Total	Pb (mg/kg)	Total Pb(ug)	Pb % of Total	Zn (mg/kg)	Total Zn(ug)	Zn % of Total
<0.063 mm	22.654	70.4%	9.88	223.83	72.8%	4.34	98.27	83.4%	306.78	6949.9	81.6%	359.02	8133.1	81.7%	1297.09	29384.2	79.5%
<0.002 mm	*2.480*	*7.7%*	*2.48*	*6.15*	*2.0%*	*10.1*	*25.05*	*21.3%*	*10.1*	*25.0*	*0.3%*	*816*	*2023.7*	*20.3%*	*2410*	*5976.8*	*16.2%*
0.002-0.02 mm	*14.030*	*43.6%*	*14.03*	*196.84*	*64.0%*	*3.95*	*55.42*	*47.0%*	*367*	*5149.0*	*60.5%*	*310*	*4349.3*	*43.7%*	*1240*	*17397.2*	*47.0%*
0.02-0.05 mm	*4.063*	*12.6%*	*4.063*	*16.51*	*5.4%*	*2.58*	*10.48*	*8.9%*	*287*	*1166.1*	*13.7%*	*277*	*1125.5*	*11.3%*	*880*	*3575.4*	*9.7%*
0.05-0.063 mm	*2.081*	*6.5%*	*2.081*	*4.33*	*1.4%*	*3.52*	*7.33*	*6.2%*	*293*	*609.7*	*7.2%*	*305*	*634.7*	*6.4%*	*1170*	*2434.8*	*6.6%*
0.063-1 mm	9.146	28.4%	9.146	83.65	27.2%	2.04	18.66	15.8%	162	1481.7	17.4%	191	1746.9	17.5%	788	7207.0	19.5%
1-2 mm	0.367	1.1%	0.367	0.13	0.0%	2.51	0.92	0.8%	230	84.4	1.0%	202	74.1	0.7%	1070	392.7	1.1%
>2 mm	0.000	0.0%		0.00	0.0%		0.00	0.0%		0.0	0.0%		0.0	0.0%		0.0	0.0%
Total	32.167			307.61			117.85			8515.9			9954.2			36983.9	

Table 17 - All Butte Hill Station Expanded Analysis Results Average

AR-MH-1, BG-CLV-01, BG-CH-C1, MSD-3A, WA-HD-1, and TX-HD-1 Average Results (Value = MDL[1])

Fraction	TSS	Arsenic	Cadmium	Copper	Lead	Zinc
<0.063 mm	80.6%	60.7%	60.5%	66.7%	67.4%	59.9%
0.063-1 mm	16.8%	10.4%	12.2%	11.6%	11.2%	12.9%
1-2 mm	2.6%	29.0%	27.3%	21.7%	21.4%	27.2%
>2 mm	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Notes

1) When a value is reported at MDL by lab, average is calculated using the MDL value

AR-MH-1, BG-CLV-01, BG-CH-C1, MSD-3A, WA-HD-1, and TX-HD-1 Average Results (Value = 1/2 MDL[1])

Fraction	TSS	Arsenic	Cadmium	Copper	Lead	Zinc
<0.063 mm	80.6%	62.8%	66.5%			
0.063-1 mm	16.8%	11.4%	13.5%			
1-2 mm	2.6%	25.8%	20.0%			
>2 mm	0.0%	0.0%	0.0%			

Notes

1) When a value is reported at MDL by lab, average is calculated using 1/2 the MDL value

2) Copper, lead, and zinc had no instances where values were as low as the MDL.

AR-MH-1, BG-CLV-01, BG-CH-C1, MSD-3A, WA-HD-1, and TX-HD-1 Average Results (Value = 0[1])

Fraction	TSS	Arsenic	Cadmium	Copper	Lead	Zinc
<0.063 mm	80.6%	77.7%	82.4%			
0.063-1 mm	16.8%	18.0%	17.6%			
1-2 mm	2.6%	4.4%	0.0%			
>2 mm	0.0%	0.0%	0.0%			

Notes

1) When a value is reported at MDL by lab, average is calculated using 0 in place of the MDL value

2) Copper, lead, and zinc had no instances where values were as low as the MDL.

Table 18 - Arsenic Capture Rates (for BG-CLV-01 Expanded Analysis Results)

	Expanded Analysis Sample Date	Total Sediment Mass (g)	Size	Fraction Mass (g)	Capture Efficiency (%)	Sediment Captured (g)	Sediment Captured (%)	Arsenic (mg/kg)	Arsenic (mg)	Arsenic (% of total)	Arsenic Captured (mg)	Arsenic Captured (%)
Q = 25% of Design Flow	6/17/2014	3.63	<0.063	3.27	29.3%	1.32	36%	20.0	0.065	18.9%	0.019	87%
			0.063-1 mm	0.3078	100.0%			15.2	0.005	1.4%	0.005	
			1-2 mm	0.056	100.0%			4910	0.275	79.7%	0.275	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	39.9%	18.55	58%	9.9	0.224	64.9%	0.089	56%
			0.063-1 mm	9.146	100.0%			9.1	0.084	24.3%	0.084	
			1-2 mm	0.367	100.0%			0.4	0.000	0.0%	0.000	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 50% of Design Flow	6/17/2014	3.63	<0.063	3.27	20.0%	1.02	28%	20.0	0.065	18.9%	0.013	85%
			0.063-1 mm	0.3078	100.0%			15.2	0.005	1.4%	0.005	
			1-2 mm	0.056	100.0%			4910	0.275	79.7%	0.275	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	34.1%	17.24	54%	9.9	0.224	64.9%	0.076	52%
			0.063-1 mm	9.146	100.0%			9.1	0.084	24.3%	0.084	
			1-2 mm	0.367	100.0%			0.4	0.000	0.0%	0.000	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 75% of Design Flow	6/17/2014	3.63	<0.063	3.27	10.0%	0.69	19%	20.0	0.065	18.9%	0.007	83%
			0.063-1 mm	0.3078	100.0%			15.2	0.005	1.4%	0.005	
			1-2 mm	0.056	100.0%			4910	0.275	79.7%	0.275	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.5%	16.20	50%	9.9	0.224	64.9%	0.066	49%
			0.063-1 mm	9.146	100.0%			9.1	0.084	24.3%	0.084	
			1-2 mm	0.367	100.0%			0.4	0.000	0.0%	0.000	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 100% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.9%	0.69	19%	20.0	0.065	18.9%	0.006	83%
			0.063-1 mm	0.3078	100.0%			15.2	0.005	1.4%	0.005	
			1-2 mm	0.056	100.0%			4910	0.275	79.7%	0.275	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.2%	16.13	50%	9.9	0.224	64.9%	0.065	48%
			0.063-1 mm	9.146	100.0%			9.1	0.084	24.3%	0.084	
			1-2 mm	0.367	100.0%			0.4	0.000	0.0%	0.000	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 125% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.8%	0.68	19%	20.0	0.065	18.9%	0.006	83%
			0.063-1 mm	0.3078	100.0%			15.2	0.005	1.4%	0.005	
			1-2 mm	0.056	100.0%			4910	0.275	79.7%	0.275	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	28.6%	15.99	50%	9.9	0.224	64.9%	0.064	48%
			0.063-1 mm	9.146	100.0%			9.1	0.084	24.3%	0.084	
			1-2 mm	0.367	100.0%			0.4	0.000	0.0%	0.000	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	

Table 19 - Cadmium Capture Rates (for BG-CLV-01 Expanded Analysis Results)

	Expanded Analysis Sample Date	Total Sediment Mass (g)	Size	Fraction Mass (g)	Capture Efficiency (%)	Sediment Captured (g)	Sediment Captured (%)	Cadmium (mg/kg)	Cadmium (mg)	Cadmium (% of total)	Cadmium Captured (mg)	Cadmium Captured (%)
Q = 25% of Design Flow	6/17/2014	3.63	<0.063	3.27	29.3%	1.32	36%	0.4	0.001	6.2%	0.000	96%
			0.063-1 mm	0.3078	100.0%			8.2	0.003	11.1%	0.003	
			1-2 mm	0.056	100.0%			335	0.019	82.7%	0.019	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	39.9%	18.55	58%	4.3	0.098	433.3%	0.039	50%
			0.063-1 mm	9.146	100.0%			2.0	0.019	82.3%	0.019	
			1-2 mm	0.367	100.0%			2.5	0.001	4.1%	0.001	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 50% of Design Flow	6/17/2014	3.63	<0.063	3.27	20.0%	1.02	28%	0.4	0.001	6.2%	0.000	95%
			0.063-1 mm	0.3078	100.0%			8.2	0.003	11.1%	0.003	
			1-2 mm	0.056	100.0%			335	0.019	82.7%	0.019	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	34.1%	17.24	54%	4.3	0.098	433.3%	0.034	45%
			0.063-1 mm	9.146	100.0%			2.0	0.019	82.3%	0.019	
			1-2 mm	0.367	100.0%			2.5	0.001	4.1%	0.001	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 75% of Design Flow	6/17/2014	3.63	<0.063	3.27	10.0%	0.69	19%	0.4	0.001	6.2%	0.000	94%
			0.063-1 mm	0.3078	100.0%			8.2	0.003	11.1%	0.003	
			1-2 mm	0.056	100.0%			335	0.019	82.7%	0.019	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.5%	16.20	50%	4.3	0.098	433.3%	0.029	41%
			0.063-1 mm	9.146	100.0%			2.0	0.019	82.3%	0.019	
			1-2 mm	0.367	100.0%			2.5	0.001	4.1%	0.001	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 100% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.9%	0.69	19%	0.4	0.001	6.2%	0.000	94%
			0.063-1 mm	0.3078	100.0%			8.2	0.003	11.1%	0.003	
			1-2 mm	0.056	100.0%			335	0.019	82.7%	0.019	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.2%	16.13	50%	4.3	0.098	433.3%	0.029	41%
			0.063-1 mm	9.146	100.0%			2.0	0.019	82.3%	0.019	
			1-2 mm	0.367	100.0%			2.5	0.001	4.1%	0.001	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 125% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.8%	0.68	19%	0.4	0.001	6.2%	0.000	94%
			0.063-1 mm	0.3078	100.0%			8.2	0.003	11.1%	0.003	
			1-2 mm	0.056	100.0%			335	0.019	82.7%	0.019	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	28.6%	15.99	50%	4.3	0.098	433.3%	0.028	40%
			0.063-1 mm	9.146	100.0%			2.0	0.019	82.3%	0.019	
			1-2 mm	0.367	100.0%			2.5	0.001	4.1%	0.001	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	

Table 20 - Copper Capture Rates (for BG-CLV-01 Expanded Analysis Results)

	Expanded Analysis Sample Date	Total Sediment Mass (g)	Size	Fraction Mass (g)	Capture Efficiency (%)	Sediment Captured (g)	Sediment Captured (%)	Copper (mg/kg)	Copper (mg)	Copper (% of total)	Copper Captured (mg)	Copper Captured (%)
Q = 25% of Design Flow	6/17/2014	3.63	<0.063	3.27	29.3%	1.32	36%	219.5	0.718	80.5%	0.210	43.1%
			0.063-1 mm	0.3078	100.0%			196	0.060	6.8%	0.060	
			1-2 mm	0.056	100.0%			2020	0.113	12.7%	0.113	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	39.9%	18.55	58%	306.8	6.950	779.9%	2.773	51.0%
			0.063-1 mm	9.146	100.0%			162.0	1.482	166.3%	1.482	
			1-2 mm	0.367	100.0%			230.0	0.084	9.5%	0.084	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 50% of Design Flow	6/17/2014	3.63	<0.063	3.27	20.0%	1.02	28%	219.5	0.718	80.5%	0.144	35.6%
			0.063-1 mm	0.3078	100.0%			196	0.060	6.8%	0.060	
			1-2 mm	0.056	100.0%			2020	0.113	12.7%	0.113	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	34.1%	17.24	54%	306.8	6.950	779.9%	2.370	46.2%
			0.063-1 mm	9.146	100.0%			162.0	1.482	166.3%	1.482	
			1-2 mm	0.367	100.0%			230.0	0.084	9.5%	0.084	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 75% of Design Flow	6/17/2014	3.63	<0.063	3.27	10.0%	0.69	19%	219.5	0.718	80.5%	0.072	27.5%
			0.063-1 mm	0.3078	100.0%			196	0.060	6.8%	0.060	
			1-2 mm	0.056	100.0%			2020	0.113	12.7%	0.113	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.5%	16.20	50%	306.8	6.950	779.9%	2.050	42.5%
			0.063-1 mm	9.146	100.0%			162.0	1.482	166.3%	1.482	
			1-2 mm	0.367	100.0%			230.0	0.084	9.5%	0.084	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 100% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.9%	0.69	19%	219.5	0.718	80.5%	0.071	27.4%
			0.063-1 mm	0.3078	100.0%			196	0.060	6.8%	0.060	
			1-2 mm	0.056	100.0%			2020	0.113	12.7%	0.113	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.2%	16.13	50%	306.8	6.950	779.9%	2.029	42.2%
			0.063-1 mm	9.146	100.0%			162.0	1.482	166.3%	1.482	
			1-2 mm	0.367	100.0%			230.0	0.084	9.5%	0.084	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 125% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.8%	0.68	19%	219.5	0.718	80.5%	0.070	27.4%
			0.063-1 mm	0.3078	100.0%			196	0.060	6.8%	0.060	
			1-2 mm	0.056	100.0%			2020	0.113	12.7%	0.113	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	28.6%	15.99	50%	306.8	6.950	779.9%	1.988	41.7%
			0.063-1 mm	9.146	100.0%			162.0	1.482	166.3%	1.482	
			1-2 mm	0.367	100.0%			230.0	0.084	9.5%	0.084	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	

Table 21 - Lead Capture Rates (for BG-CLV-01 Expanded Analysis Results)

	Expanded Analysis Sample Date	Total Sediment Mass (g)	Size	Fraction Mass (g)	Capture Efficiency (%)	Sediment Captured (g)	Sediment Captured (%)	Lead (mg/kg)	Lead (mg)	Lead (% of total)	Lead Captured (mg)	Lead Captured (%)
Q = 25% of Design Flow	6/17/2014	3.63	<0.063	3.27	29.3%	1.32	36%	363.8	1.189	89.6%	0.349	37%
			0.063-1 mm	0.3078	100.0%			220	0.068	5.1%	0.068	
			1-2 mm	0.056	100.0%			1260	0.071	5.3%	0.071	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	39.9%	18.55	58%	359.0	8.133	612.5%	3.245	51%
			0.063-1 mm	9.146	100.0%			191.0	1.747	131.6%	1.747	
			1-2 mm	0.367	100.0%			202.0	0.074	5.6%	0.074	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 50% of Design Flow	6/17/2014	3.63	<0.063	3.27	20.0%	1.02	28%	363.8	1.189	89.6%	0.238	28%
			0.063-1 mm	0.3078	100.0%			220	0.068	5.1%	0.068	
			1-2 mm	0.056	100.0%			1260	0.071	5.3%	0.071	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	34.1%	17.24	54%	359.0	8.133	612.5%	2.773	46%
			0.063-1 mm	9.146	100.0%			191.0	1.747	131.6%	1.747	
			1-2 mm	0.367	100.0%			202.0	0.074	5.6%	0.074	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 75% of Design Flow	6/17/2014	3.63	<0.063	3.27	10.0%	0.69	19%	363.8	1.189	89.6%	0.119	19%
			0.063-1 mm	0.3078	100.0%			220	0.068	5.1%	0.068	
			1-2 mm	0.056	100.0%			1260	0.071	5.3%	0.071	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.5%	16.20	50%	359.0	8.133	612.5%	2.399	42%
			0.063-1 mm	9.146	100.0%			191.0	1.747	131.6%	1.747	
			1-2 mm	0.367	100.0%			202.0	0.074	5.6%	0.074	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 100% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.9%	0.69	19%	363.8	1.189	89.6%	0.118	19%
			0.063-1 mm	0.3078	100.0%			220	0.068	5.1%	0.068	
			1-2 mm	0.056	100.0%			1260	0.071	5.3%	0.071	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.2%	16.13	50%	359.0	8.133	612.5%	2.375	42%
			0.063-1 mm	9.146	100.0%			191.0	1.747	131.6%	1.747	
			1-2 mm	0.367	100.0%			202.0	0.074	5.6%	0.074	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 125% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.8%	0.68	19%	363.8	1.189	89.6%	0.117	19%
			0.063-1 mm	0.3078	100.0%			220	0.068	5.1%	0.068	
			1-2 mm	0.056	100.0%			1260	0.071	5.3%	0.071	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	28.6%	15.99	50%	359.0	8.133	612.5%	2.326	42%
			0.063-1 mm	9.146	100.0%			191.0	1.747	131.6%	1.747	
			1-2 mm	0.367	100.0%			202.0	0.074	5.6%	0.074	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	

Table 22 - Zinc Capture Rates (for BG-CLV-01 Expanded Analysis Results)

	Expanded Analysis Sample Date	Total Sediment Mass (g)	Size	Fraction Mass (g)	Capture Efficiency (%)	Sediment Captured (g)	Sediment Captured (%)	Zinc (mg/kg)	Zinc (mg)	Zinc (% of total)	Zinc Captured (mg)	Zinc Captured (%)
Q = 25% of Design Flow	6/17/2014	3.63	<0.063	3.27	29.3%	1.32	36%	1265.8	4.139	76.9%	1.213	45.6%
			0.063-1 mm	0.3078	100.0%			583	0.179	3.3%	0.179	
			1-2 mm	0.056	100.0%			19000	1.064	19.8%	1.064	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	39.9%	18.55	58%	299.0	6.774	125.8%	2.703	72%
			0.063-1 mm	9.146	100.0%			788.0	7.207	133.9%	7.207	
			1-2 mm	0.367	100.0%			1070.0	0.393	7.3%	0.393	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 50% of Design Flow	6/17/2014	3.63	<0.063	3.27	20.0%	1.02	28%	1265.8	4.139	76.9%	0.828	38%
			0.063-1 mm	0.3078	100.0%			583	0.179	3.3%	0.179	
			1-2 mm	0.056	100.0%			19000	1.064	19.8%	1.064	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	34.1%	17.24	54%	299.0	6.774	125.8%	2.310	69%
			0.063-1 mm	9.146	100.0%			788.0	7.207	133.9%	7.207	
			1-2 mm	0.367	100.0%			1070.0	0.393	7.3%	0.393	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 75% of Design Flow	6/17/2014	3.63	<0.063	3.27	10.0%	0.69	19%	1265.8	4.139	76.9%	0.414	31%
			0.063-1 mm	0.3078	100.0%			583	0.179	3.3%	0.179	
			1-2 mm	0.056	100.0%			19000	1.064	19.8%	1.064	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.5%	16.20	50%	299.0	6.774	125.8%	1.998	67%
			0.063-1 mm	9.146	100.0%			788.0	7.207	133.9%	7.207	
			1-2 mm	0.367	100.0%			1070.0	0.393	7.3%	0.393	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 100% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.9%	0.69	19%	1265.8	4.139	76.9%	0.410	31%
			0.063-1 mm	0.3078	100.0%			583	0.179	3.3%	0.179	
			1-2 mm	0.056	100.0%			19000	1.064	19.8%	1.064	
			2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	29.2%	16.13	50%	299.0	6.774	125.8%	1.978	67%
			0.063-1 mm	9.146	100.0%			788.0	7.207	133.9%	7.207	
			1-2 mm	0.367	100.0%			1070.0	0.393	7.3%	0.393	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
Q = 125% of Design Flow	6/17/2014	3.63	<0.063	3.27	9.8%	0.68	19%	1265.8	4.139	76.9%	0.406	31%
			0.063-1 mm	0.3078	100.0%			583	0.179	3.3%	0.179	
			1-2 mm	0.056	100.0%			19000	1.064	19.8%	1.064	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	
	8/12/2014	32.17	<0.063	22.654	28.6%	15.99	50%	299.0	6.774	125.8%	1.937	66%
			0.063-1 mm	9.146	100.0%			788.0	7.207	133.9%	7.207	
			1-2 mm	0.367	100.0%			1070.0	0.393	7.3%	0.393	
			>2 mm	0	100.0%			n/a	n/a	n/a	n/a	

Table 23 - Arsenic Capture Rates (for All Butte Hill Expanded Analysis Results)

					0 when at MDL		Half of MDL when at MDL		MDL Value when at MDL	
	Size	Capture Efficiency (%)	Sediment % of Total [1]	Sediment Capture (%)	Arsenic % of Total [1]	Arsenic Capture (%)	Arsenic % of Total [1]	Arsenic Capture (%)	Arsenic % of Total [1]	Arsenic Capture (%)
Q = 25% of Design Flow	<0.063	27.8%	80.6%		77.7%		62.8%		60.7%	
	0.063-1 mr	100.0%	16.8%		18.0%		11.4%		10.4%	
	1-2 mm	100.0%	2.5%		4.4%		25.8%		29.0%	
	2 mm	100.0%	0.0%	42%	0.0%	44%	0.0%	55%	0.0%	56%
Q = 50% of Design Flow	<0.063	22.8%	80.6%		77.7%		62.8%		60.7%	
	0.063-1 mr	100.0%	16.8%		18.0%		11.4%		10.4%	
	1-2 mm	100.0%	2.5%		4.4%		25.8%		29.0%	
	2 mm	100.0%	0.0%	38%	0.0%	40%	0.0%	52%	0.0%	53%
Q = 75% of Design Flow	<0.063	19.4%	80.6%		77.7%		62.8%		60.7%	
	0.063-1 mr	100.0%	16.8%		18.0%		11.4%		10.4%	
	1-2 mm	100.0%	2.5%		4.4%		25.8%		29.0%	
	2 mm	100.0%	0.0%	35%	0.0%	37%	0.0%	49%	0.0%	51%
Q = 100% of Design Flow	<0.063	19.4%	80.6%		77.7%		62.8%		60.7%	
	0.063-1 mr	100.0%	16.8%		18.0%		11.4%		10.4%	
	1-2 mm	100.0%	2.5%		4.4%		25.8%		29.0%	
	2 mm	100.0%	0.0%	35%	0.0%	37%	0.0%	49%	0.0%	51%
Q = 120% of Design Flow	<0.063	19.2%	80.6%		77.7%		62.8%		60.7%	
	0.063-1 mr	100.0%	16.8%		18.0%		11.4%		10.4%	
	1-2 mm	100.0%	2.5%		4.4%		25.8%		29.0%	
	2 mm	100.0%	0.0%	35%	0.0%	37%	0.0%	49%	0.0%	51%

1) Average of all sites, not including SS-07 and SS-04 and only includes values above MDL

Table 24 - Cadmium Capture Rates (for All Butte Hill Expanded Analysis Results)

					0 when at MDL		Half of MDL when at MDL		MDL Value when at MDL	
	Size	Capture Efficiency (%)	Sediment % of Total [1]	Sediment Capture (%)			Arsenic % of Total [1]	Arsenic Capture (%)		
Q = 25% of Design Flow	<0.063	27.8%	80.6%		82.4%		66.5%		60.5%	
	0.063-1 mr	100.0%	16.8%		17.6%		13.5%		12.2%	
	1-2 mm	100.0%	2.5%		0.0%		20.0%		27.3%	
	2 mm	100.0%	0.0%	42%	0.0%	41%	0.0%	52%	0.0%	56%
Q = 50% of Design Flow	<0.063	22.8%	80.6%		82.4%		66.5%		60.5%	
	0.063-1 mr	100.0%	16.8%		17.6%		13.5%		12.2%	
	1-2 mm	100.0%	2.5%		0.0%		20.0%		27.3%	
	2 mm	100.0%	0.0%	38%	0.0%	36%	0.0%	49%	0.0%	53%
Q = 75% of Design Flow	<0.063	19.4%	80.6%		82.4%		66.5%		60.5%	
	0.063-1 mr	100.0%	16.8%		17.6%		13.5%		12.2%	
	1-2 mm	100.0%	2.5%		0.0%		20.0%		27.3%	
	2 mm	100.0%	0.0%	35%	0.0%	34%	0.0%	46%	0.0%	51%
Q = 100% of Design Flow	<0.063	19.4%	80.6%		82.4%		66.5%		60.5%	
	0.063-1 mr	100.0%	16.8%		17.6%		13.5%		12.2%	
	1-2 mm	100.0%	2.5%		0.0%		20.0%		27.3%	
	2 mm	100.0%	0.0%	35%	0.0%	34%	0.0%	46%	0.0%	51%
Q = 120% of Design Flow	<0.063	19.2%	80.6%		82.4%		66.5%		60.5%	
	0.063-1 mr	100.0%	16.8%		17.6%		13.5%		12.2%	
	1-2 mm	100.0%	2.5%		0.0%		20.0%		27.3%	
	2 mm	100.0%	0.0%	35%	0.0%	33%	0.0%	46%	0.0%	51%

1) Average of all sites, not including SS-07 and SS-04 and only includes values above MDL

Table 25 - Copper Capture Rates (for All Butte Hill Expanded Analysis Results)

					MDL Value when at MDL	
	Size	Capture Efficiency (%)	Sediment % of Total [1]	Sediment Capture (%)	Copper % of Total [1]	Copper Capture (%)
Q = 25% of Design Flow	<0.063	27.8%	80.6%		66.7%	
	0.063-1 mr	100.0%	16.8%		11.6%	
	1-2 mm	100.0%	2.5%		21.7%	
	2 mm	100.0%	0.0%	42%	0.0%	52%
Q = 50% of Design Flow	<0.063	22.8%	80.6%		66.7%	
	0.063-1 mr	100.0%	16.8%		11.6%	
	1-2 mm	100.0%	2.5%		21.7%	
	2 mm	100.0%	0.0%	38%	0.0%	49%
Q = 75% of Design Flow	<0.063	19.4%	80.6%		66.7%	
	0.063-1 mr	100.0%	16.8%		11.6%	
	1-2 mm	100.0%	2.5%		21.7%	
	2 mm	100.0%	0.0%	35%	0.0%	46%
Q = 100% of Design Flow	<0.063	19.4%	80.6%		66.7%	
	0.063-1 mr	100.0%	16.8%		11.6%	
	1-2 mm	100.0%	2.5%		21.7%	
	2 mm	100.0%	0.0%	35%	0.0%	46%
Q = 120% of Design Flow	<0.063	19.2%	80.6%		66.7%	
	0.063-1 mr	100.0%	16.8%		11.6%	
	1-2 mm	100.0%	2.5%		21.7%	
	2 mm	100.0%	0.0%	35%	0.0%	46%

1) Average of all sites, not including SS-07 and SS-04 and only includes values above MDL

Table 26 - Lead Capture Rates (for All Butte Hill Expanded Analysis Results)

					MDL Value when at MDL	
	Size	Capture Efficiency (%)	Sediment % of Total [1]	Sediment Capture (%)	Lead % of Total [1]	Lead Capture (%)
Q = 25% of Design Flow	<0.063	27.8%	80.6%		67.4%	
	0.063-1 mr	100.0%	16.8%		11.2%	
	1-2 mm	100.0%	2.5%		21.4%	
	2 mm	100.0%	0.0%	42%	0.0%	51%
Q = 50% of Design Flow	<0.063	22.8%	80.6%		67.4%	
	0.063-1 mr	100.0%	16.8%		11.2%	
	1-2 mm	100.0%	2.5%		21.4%	
	2 mm	100.0%	0.0%	38%	0.0%	48%
Q = 75% of Design Flow	<0.063	19.4%	80.6%		67.4%	
	0.063-1 mr	100.0%	16.8%		11.2%	
	1-2 mm	100.0%	2.5%		21.4%	
	2 mm	100.0%	0.0%	35%	0.0%	46%
Q = 100% of Design Flow	<0.063	19.4%	80.6%		67.4%	
	0.063-1 mr	100.0%	16.8%		11.2%	
	1-2 mm	100.0%	2.5%		21.4%	
	2 mm	100.0%	0.0%	35%	0.0%	46%
Q = 120% of Design Flow	<0.063	19.2%	80.6%		67.4%	
	0.063-1 mr	100.0%	16.8%		11.2%	
	1-2 mm	100.0%	2.5%		21.4%	
	2 mm	100.0%	0.0%	35%	0.0%	46%

1) Average of all sites, not including SS-07 and SS-04 and only includes values above MDL

Table 27 - Zinc Capture Rates (for All Butte Hill Expanded Analysis Results)

					MDL Value when at MDL	
	Size	Capture Efficiency (%)	Sediment % of Total [1]	Sediment Capture (%)	Zinc % of Total [1]	Zinc Capture (%)
Q = 25% of Design Flow	<0.063	27.8%	80.6%		59.9%	
	0.063-1 mr	100.0%	16.8%		12.9%	
	1-2 mm	100.0%	2.5%		27.2%	
	2 mm	100.0%	0.0%	42%	0.0%	57%
Q = 50% of Design Flow	<0.063	22.8%	80.6%		59.9%	
	0.063-1 mr	100.0%	16.8%		12.9%	
	1-2 mm	100.0%	2.5%		27.2%	
	2 mm	100.0%	0.0%	38%	0.0%	54%
Q = 75% of Design Flow	<0.063	19.4%	80.6%		59.9%	
	0.063-1 mr	100.0%	16.8%		12.9%	
	1-2 mm	100.0%	2.5%		27.2%	
	2 mm	100.0%	0.0%	35%	0.0%	52%
Q = 100% of Design Flow	<0.063	19.4%	80.6%		59.9%	
	0.063-1 mr	100.0%	16.8%		12.9%	
	1-2 mm	100.0%	2.5%		27.2%	
	2 mm	100.0%	0.0%	35%	0.0%	52%
Q = 120% of Design Flow	<0.063	19.2%	80.6%		59.9%	
	0.063-1 mr	100.0%	16.8%		12.9%	
	1-2 mm	100.0%	2.5%		27.2%	
	2 mm	100.0%	0.0%	35%	0.0%	52%

1) Average of all sites, not including SS-07 and SS-04 and only includes values above MDL

Figure 1 – HD Evaluation Flow Chart

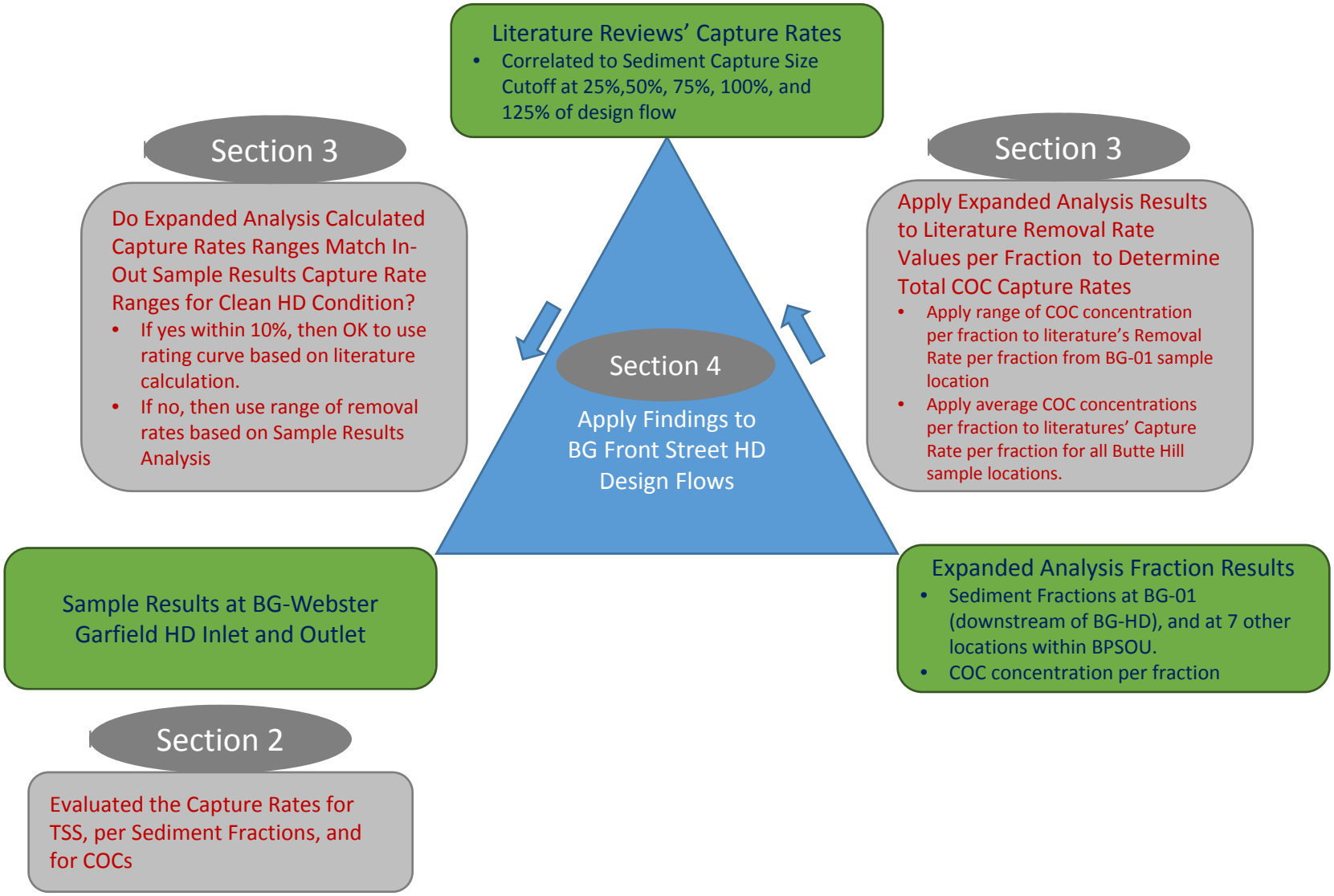
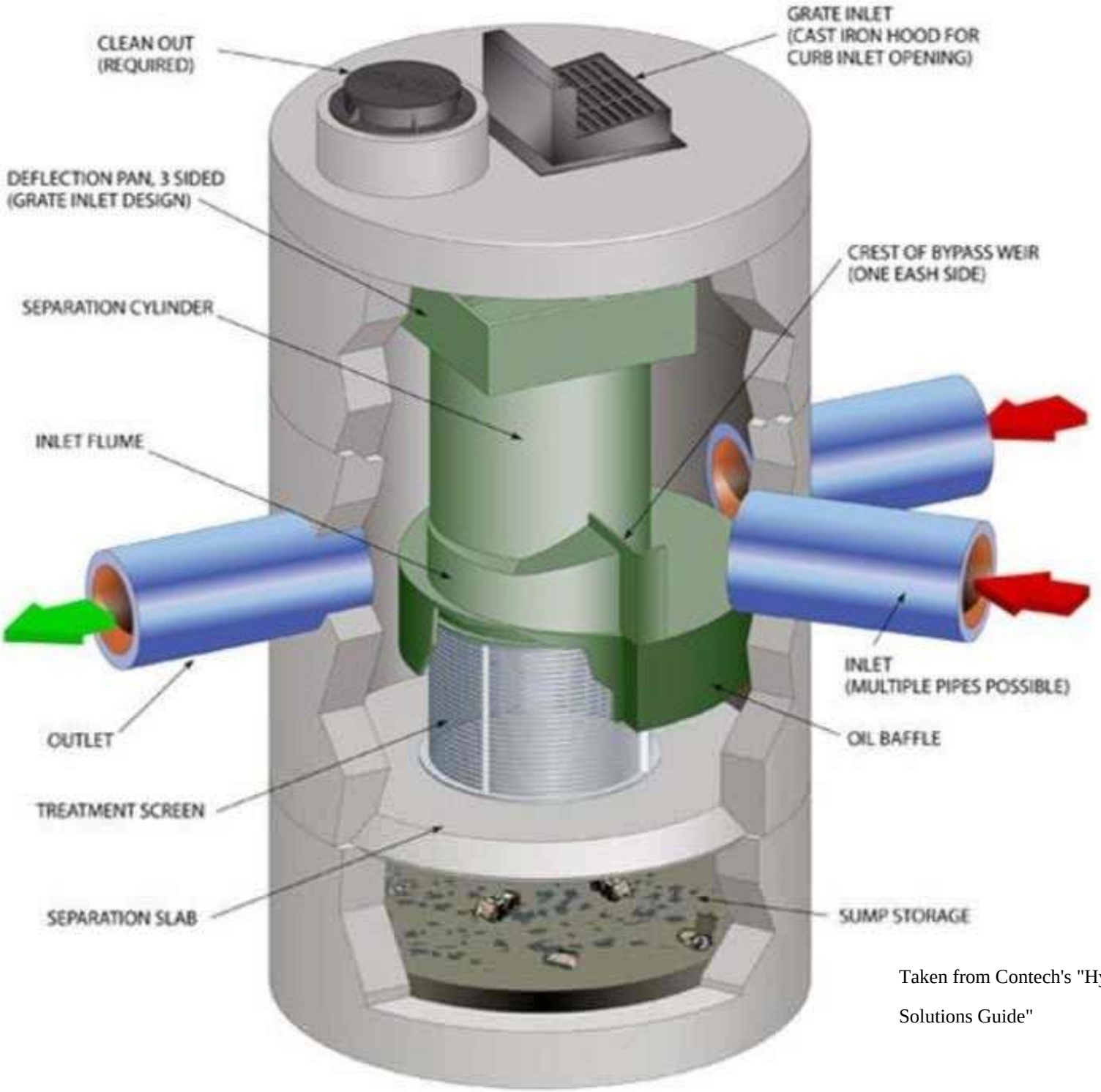


Figure 2 - HD Schematic



Taken from Contech's "Hydrodynamic Separation Solutions Guide"

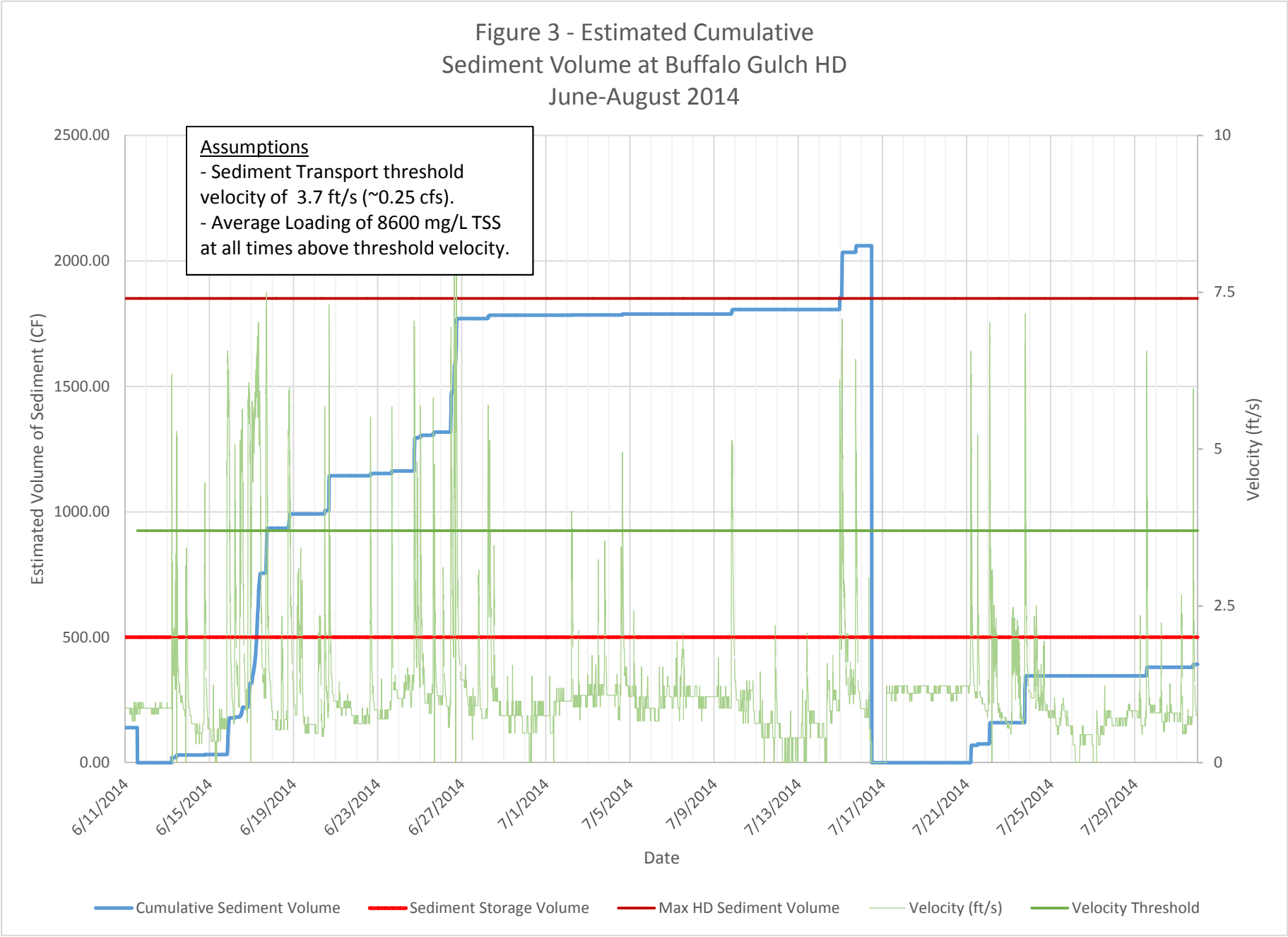
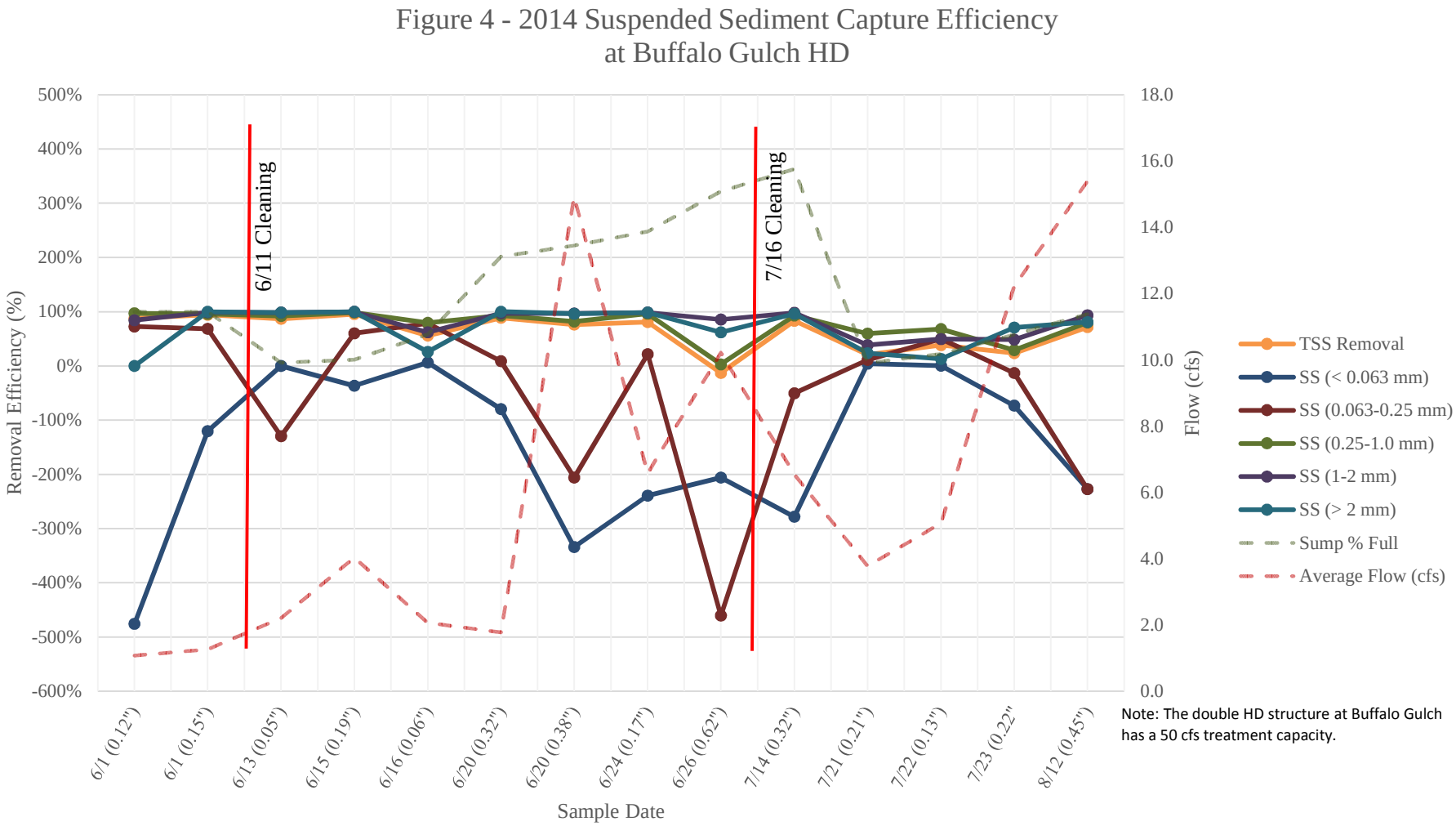


Figure 3 - Estimated Cumulative
Sediment Volume at Buffalo Gulch HD
June-August 2014
Assumptions
- Sediment Transport threshold velocity of 3.7 ft/s (~0.25 cfs).
- Average Loading of 8600 mg/L TSS at all times above threshold velocity.
Estimated Volume of Sediment (CF)
2500.00
2000.00
1500.00
1000.00
500.00
0.00
Velocity (ft/s)
10
7.5
5
2.5
0
6/11/2014
6/15/2014
6/19/2014
6/23/2014
6/27/2014
7/1/2014
7/5/2014
7/9/2014
7/13/2014
7/17/2014
7/21/2014
7/25/2014
7/29/2014
Date
Cumulative Sediment Volume
Sediment Storage Volume
Max HD Sediment Volume
Velocity (ft/s)
Velocity Threshold



Note: The double HD structure at Buffalo Gulch has a 50 cfs treatment capacity.

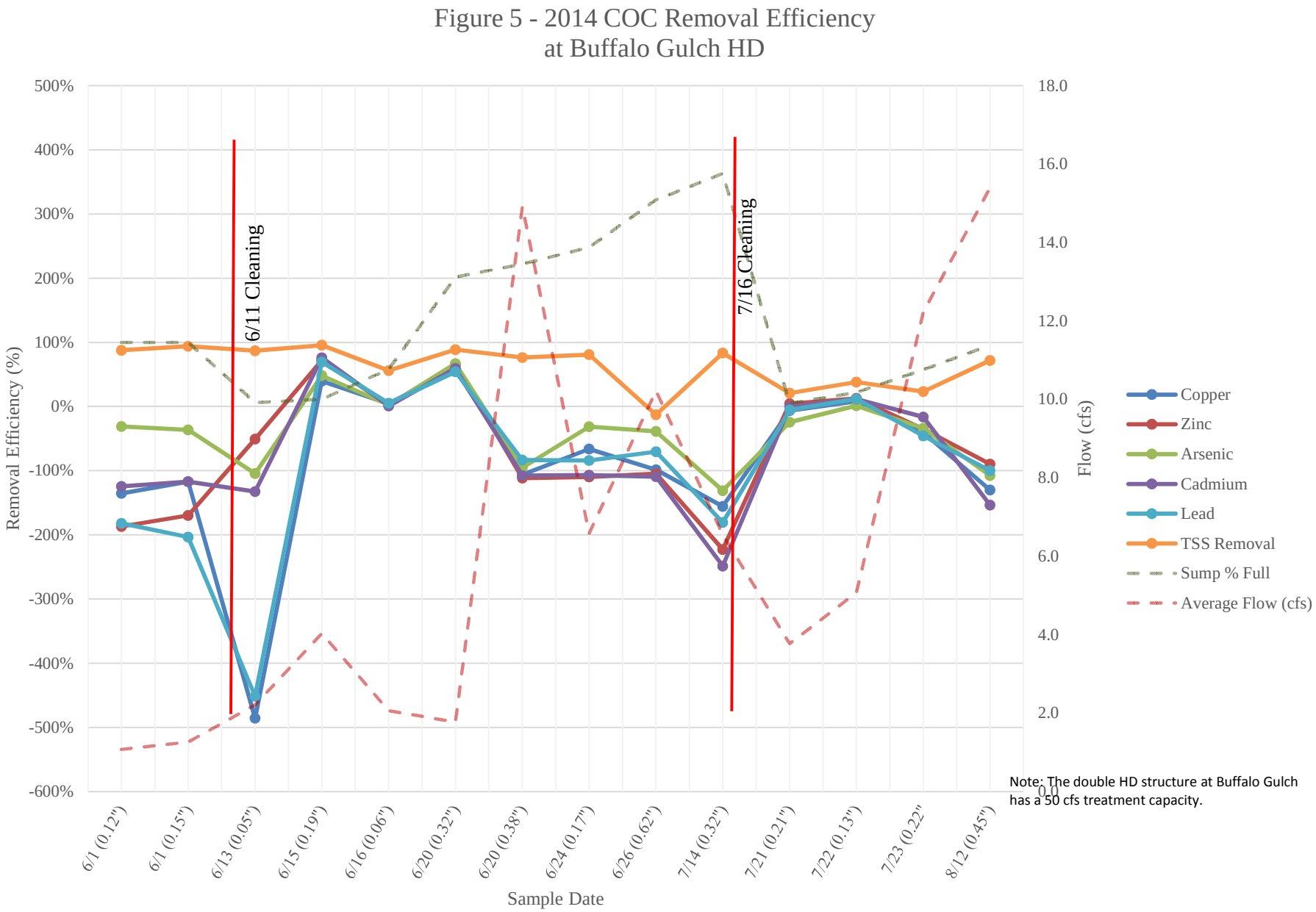


Figure 5 - 2014 COC Removal Efficiency
at Buffalo Gulch HD
Removal Efficiency (%)
500%
400%
300%
200%
100%
0%
-100%
-200%
-300%
-400%
-500%
-600%
Flow (cfs)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
6/11 Cleaning
7/16 Cleaning
6/1 (0.12")
6/1 (0.15")
6/13 (0.05")
6/15 (0.19")
6/16 (0.06")
6/20 (0.32")
6/20 (0.38")
6/24 (0.17")
6/26 (0.62")
7/14 (0.32")
7/21 (0.21")
7/22 (0.13")
7/23 (0.22"
8/12 (0.45")
Sample Date
Copper
Zinc
Arsenic
Cadmium
Lead
TSS Removal
Sump % Full
Average Flow (cfs)
Note: The double HD structure at Buffalo Gulch
has a 50 cfs treatment capacity.

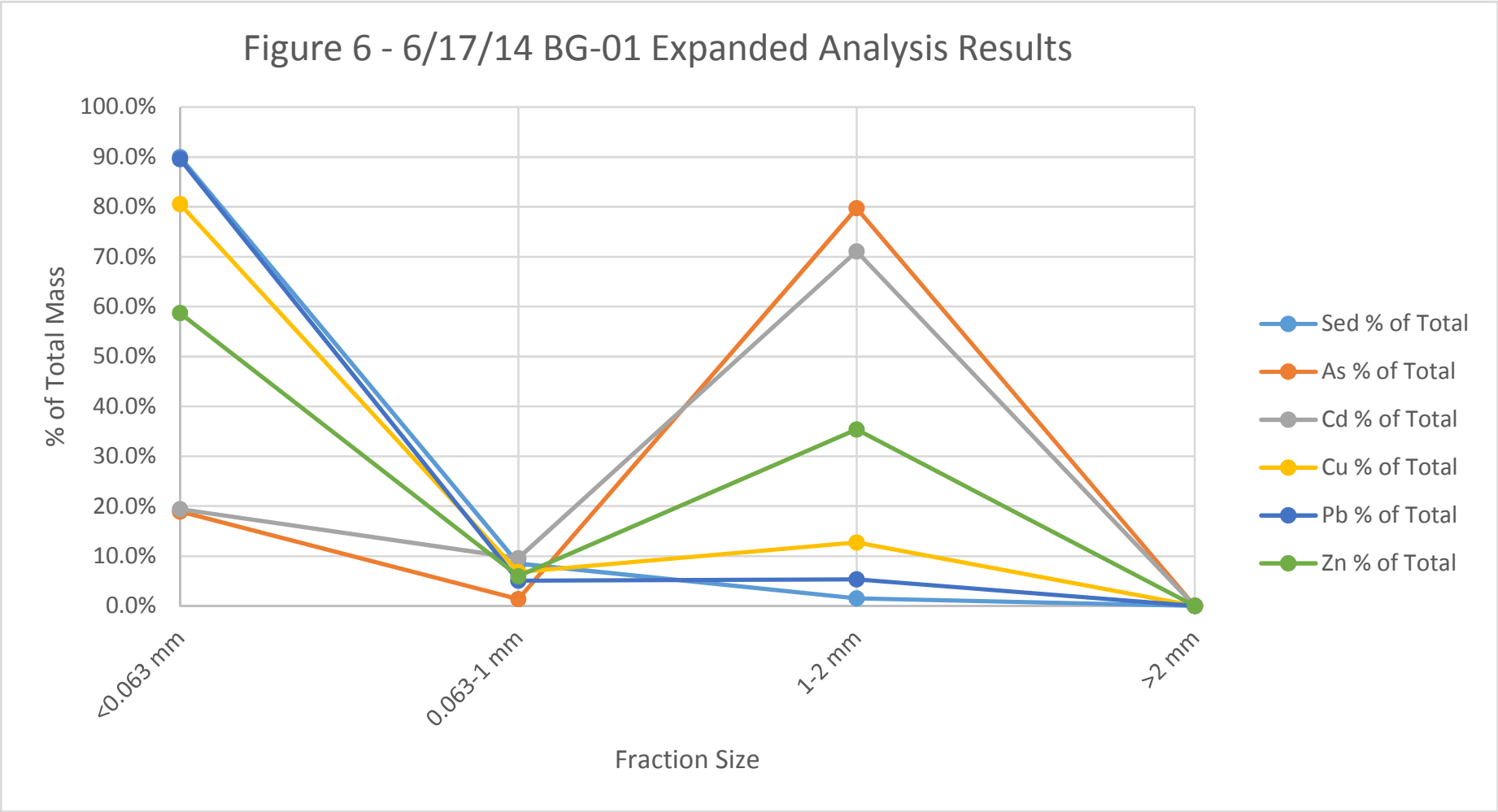


Figure 6 - 6/17/14 BG-01 Expanded Analysis Results
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
% of Total Mass
<0.063 mm
0.063-1 mm
1-2 mm
>2 mm
Fraction Size
Sed % of Total
As % of Total
Cd % of Total
Cu % of Total
Pb % of Total
Zn % of Total

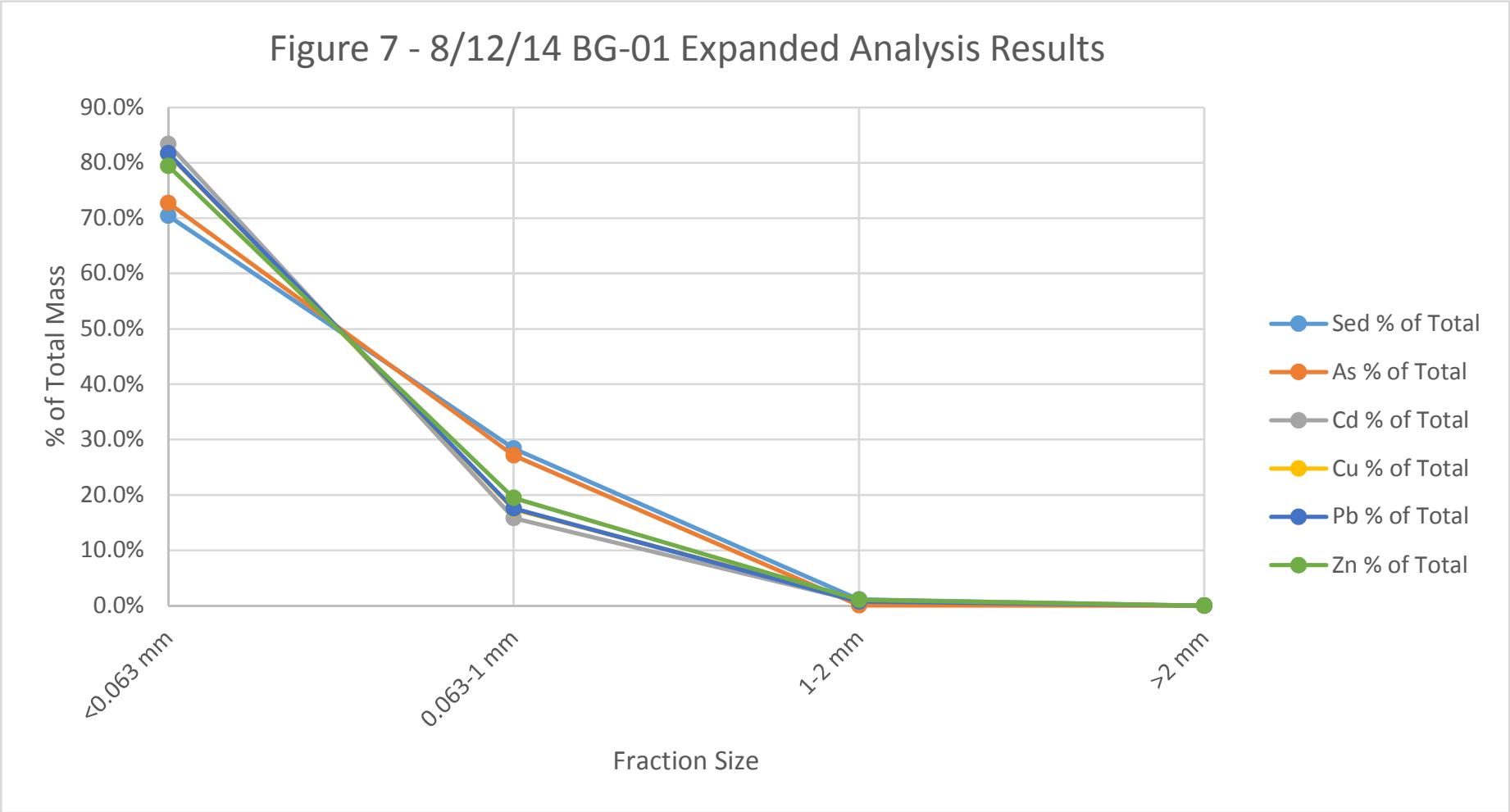


Figure 7 - 8/12/14 BG-01 Expanded Analysis Results
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
% of Total Mass
<0.063 mm
0.063-1 mm
1-2 mm
>2 mm
Fraction Size
Sed % of Total
As % of Total
Cd % of Total
Cu % of Total
Pb % of Total
Zn % of Total

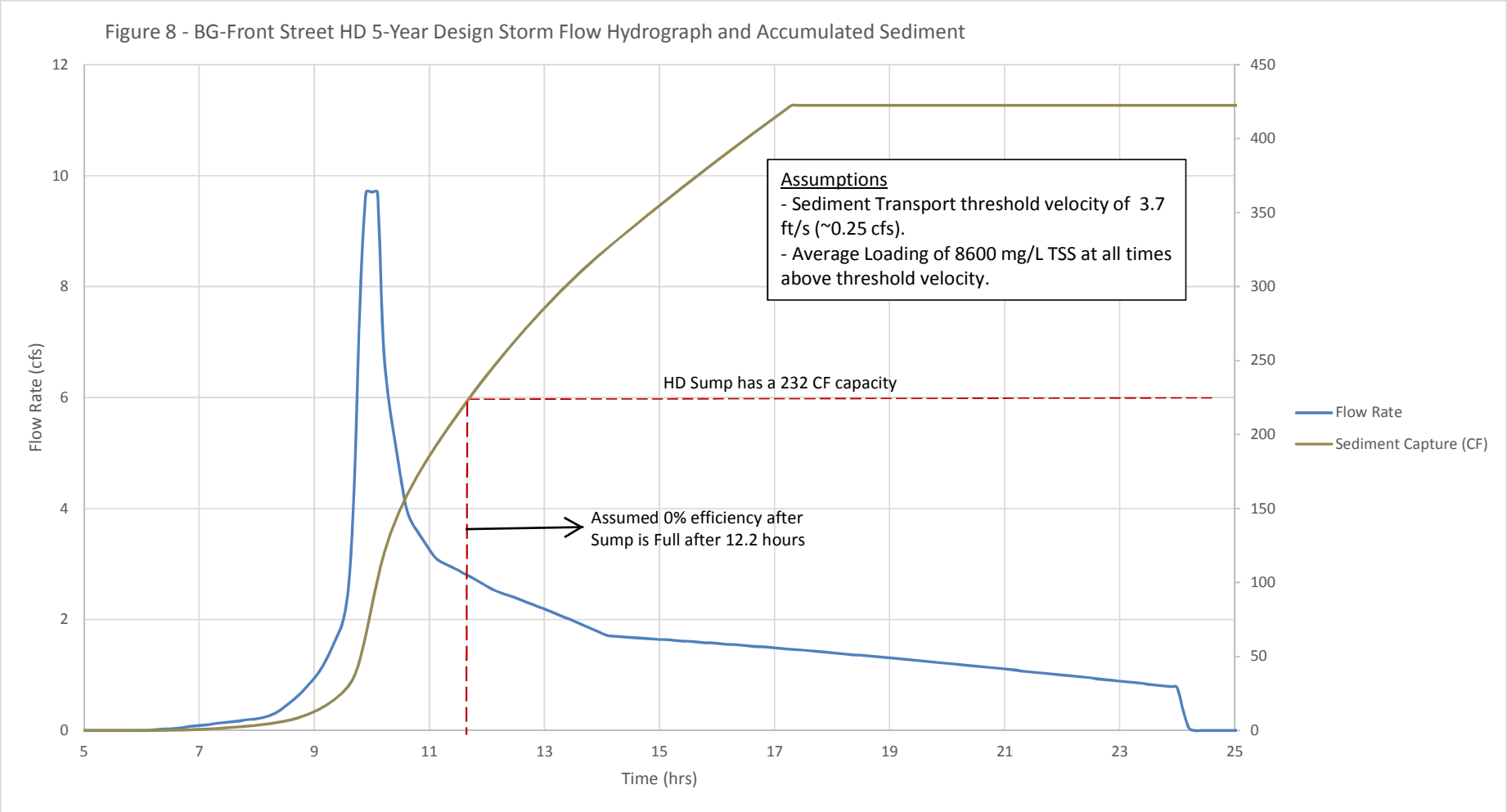


Figure 8 - BG-Front Street HD 5-Year Design Storm Flow Hydrograph and Accumulated Sediment
Flow Rate (cfs)
Time (hrs)
Assumptions
- Sediment Transport threshold velocity of 3.7 ft/s (~0.25 cfs).
- Average Loading of 8600 mg/L TSS at all times above threshold velocity.
HD Sump has a 232 CF capacity
Assumed 0% efficiency after Sump is Full after 12.2 hours
Flow Rate
Sediment Capture (CF)

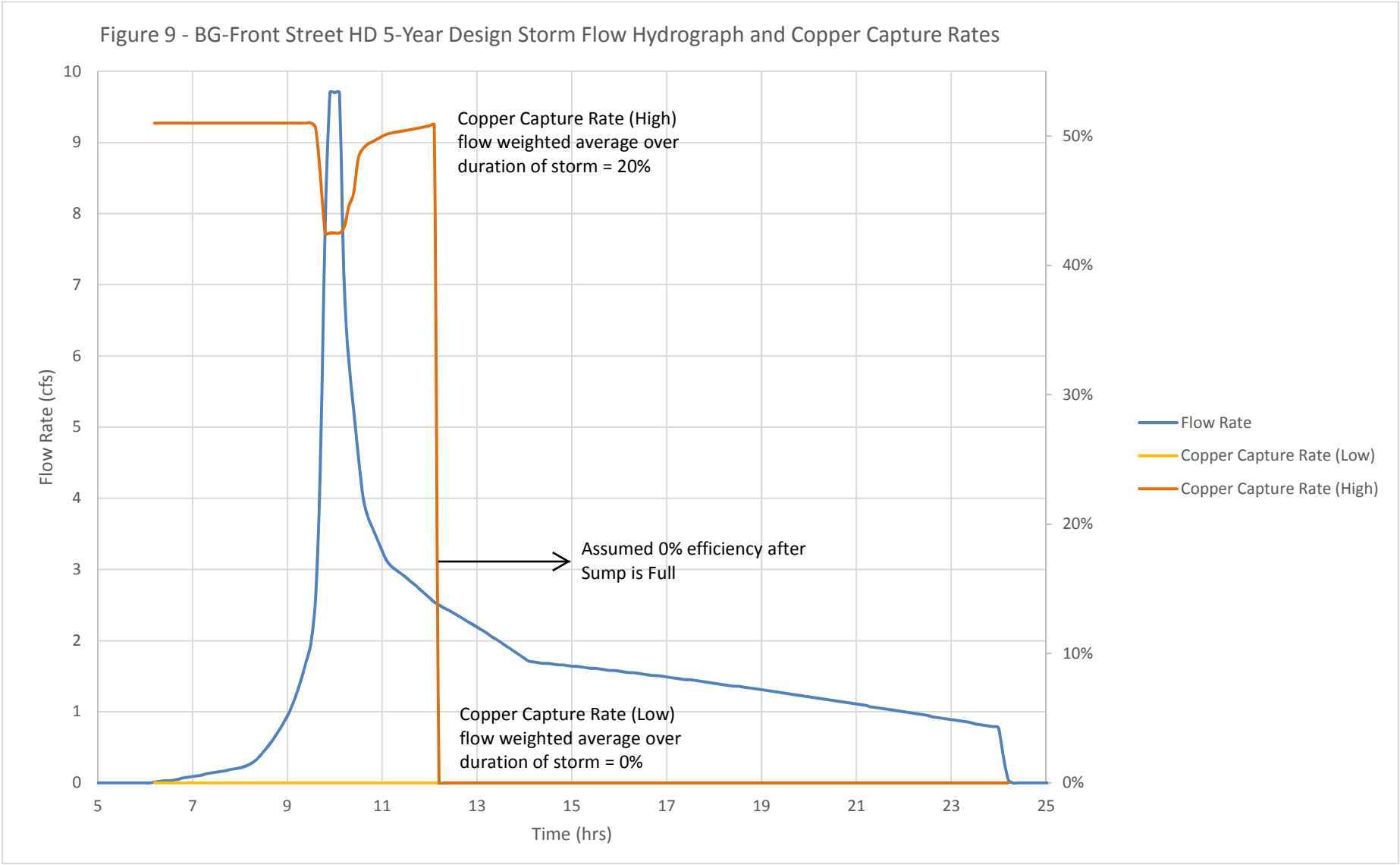


Figure 9 - BG-Front Street HD 5-Year Design Storm Flow Hydrograph and Copper Capture Rates
Flow Rate (cfs)
Time (hrs)
Copper Capture Rate (High)
flow weighted average over
duration of storm = 20%
Assumed 0% efficiency after
Sump is Full
Copper Capture Rate (Low)
flow weighted average over
duration of storm = 0%
Flow Rate
Copper Capture Rate (Low)
Copper Capture Rate (High)
0
1
2
3
4
5
6
7
8
9
10
0%
10%
20%
30%
40%
50%
5
7
9
11
13
15
17
19
21
23
25

Notes:
The user of this map is responsible for determining its suitability for his or her intended use or purpose. There is no guarantee for the accuracy of the material herin contained.

TREC, Inc.
A Woodard & Curran Company

BUTTE PRIORITY SOILS OPERABLE UNIT
SILVER BOW COUNTY - BUTTE, MT

PREPARED FOR:
Atlantic Richfield Company
a BP affiliated company

2000 1000 0 2000 Feet

Drawn: DRH	Draft Figure 1 Map of Expanded Analysis Surface Water Monitoring Stations		
Checked:	Rev. #	Description	Date
	0	Initial Draft	03/28/14
Approved:	1	Title change	05/08/14

Path: D:\GIS_Data\Butte\StaticMaps\BPSOU_SW\2014_SW_Diag_Fingerprinting_11x17.mxd 5/8/2014

APPENDIX C

DRAFT BUTTE TREATMENT LAGOONS (BTL) STORM WATER TREATMENT EVALUATION TECHNICAL REPORT

TECHNICAL MEMORANDUM 3: BPSOU TECHNOLOGY ELEMENTS EFFICIENCY EVALUATION

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

Atlantic Richfield Company

March 6, 2015

SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Draft

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

Prepared for:

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Prepared by:

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March 6, 2015

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REVISION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	Andy Dare	Draft	Issued for Atlantic Richfield Review	2/27/2015

1.0 INTRODUCTION AND PURPOSE

This 2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report (Technical Report) summarizes the feasibility of treating 200 gallons per minute of storm water at the BTL. To simulate the chemistry of these conditions, a bench-scale evaluation was conducted, as per the *Draft Final Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Work Plan* (Atlantic Richfield Company, 2013a), using storm water from Buffalo Gulch (BG), Metro Storm Drain (MSD), and a combination of both storm water sources. The results were used to evaluate the chemical effects of adding storm water during 2013 BTL treatment system conditions (which at the time were undergoing significant upgrades) and predict the ability to maintain the existing discharge targets. These results will be used with the Technology Element 10 (TE 10), Capture and Treat First Flush Retention Basins, in the Butte Priority Soils Operable Unit (BPSOU) storm water technical impracticability (TI) evaluation.

As a part of the bench scale studies, the addition of storm water to the BTL system was also evaluated in the PHREEQC Modeling of Neutralization of Storm Water Blends and Groundwater for the Lime Treatment of Water at Butte, Montana (Storm Water Geochemical Modeling). This report is included as Appendix C-1; however, an evaluation of the results, discussion, and recommendations is not included within this Technical Report.

1.1 Problem Statement

The results presented in this Technical Report will assist in evaluating the available Best Management Practice (BMP) alternatives identified within the BPSOU *Draft Final Storm Water Quality Best Management Practices Alternative Performance Evaluation Work Plan* (Atlantic Richfield Company, 2013b). The bench-scale evaluation was performed to evaluate the influence of adding 100 to 200 gpm of storm water from BG and/or MSD to the existing BTL system (assuming a 2014-observed average BTL influent flow rate of 1,273 gpm).

1.2 Background

The BTL system, located within the BPSOU of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site, is a hydrated lime (calcium hydroxide) precipitation treatment system designed to effectively treat an influent rate ranging from 1,000 up to 1,880 gpm of impacted groundwater (Table C-1). Originally constructed in 2001, the BTL system has been upgraded to improve general site characteristics and enhance the performance and reliability of peripheral site systems with the most recent upgrades occurring from 2011 to 2014. The BTL system and associated collection systems are designed to protect adjacent surface water bodies, particularly Blacktail Creek and Silver Bow Creek, through capture and treatment of impacted groundwater. Impacted water is collected from the West Camp Pump station (WCP-1), MSD Sub-Drain, Missoula Gulch, Butte Reduction Works (BRW), and the Lower Area One (LAO) Hydraulic Control Channel (HCC) as described in Table C-1. The impacted water is treated at BTL using a hydrated lime precipitation treatment system that is designed to effectively treat and remove heavy metals (copper, cadmium, and zinc) and arsenic from influent flows. The reaction of hydrated lime with impacted water results in the precipitation of a calcium carbonate and metal-oxide laden sediment that settles predominantly in the first cells of the lagoon system. The

saturated sediment is physically removed from the cells, dewatered, and the residual waste is transported off site to the Mine Waste Repository.

The BTL system is operated with discharge targets defined by the most stringent standards within the Montana Department of Environmental Quality (DEQ) Circular DEQ-7 Numeric Water Quality Standards (DEQ, 2012). The BTL discharge targets adjusted for a total hardness of 400 milligrams per liter (mg/L) (mg/L as calcium carbonate) are shown in Table C-2. The BTL discharge is sampled daily at location SS-01 within the Automatic Sampling Building (ASB) to monitor pH, and bi-weekly to monitor the discharge targets. To meet the performance targets, the 2014 average hydrated lime addition rate ranged from 109 mg/L to 167 mg/L with an average lime addition rate of 133 mg/L. During the same period, the BTL influent flow ranged from 961 gpm to 1,779 gpm with and average flow of 1,273 gpm. The recent upgrades to the BTL system have improved the consistency of the system resulting in very few exceedances of the BTL discharge target values. Maintaining a uniform, consistent flow is critical to operating the BTL system to meet the discharge target values.

2.0 STORM WATER EVALUATION PROCEDURE

The storm water treatment bench-scale evaluation was completed as outlined in the *Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Work Plan* (Atlantic Richfield Company, 2013a). Technical assistance was provided by Sims and Associates to ensure the bench-scale evaluation supported the geochemical modeling of the storm water treatment. The bench-scale testing was performed by Pioneer Technical Services, Inc. (Pioneer) personnel at their Parrot facility as described in the following sections.

2.1 Buffalo Gulch and Metro Storm Drain Storm Water Evaluation

Storm water for the bench-scale evaluation was collected from location BG-01 within BG and location MSD-3A within the lower portion of MSD as shown on Figure C-1. The storm water sample locations were chosen to replicate the addition of storm water from MSD and BG to the existing BTL influent flow. The storm water samples were collected by TREC, Inc. (TREC) and Pioneer personnel under the existing wet weather monitoring plan: *Addendum: Draft Butte Hill Diagnostic Surface Water Monitoring Plan* (Butte Hill DSWMP) (Atlantic Richfield Company, 2013c). Storm water was collected from each location as grab samples. The BG and MSD storm water samples were automatically collected by Teledyne Isco sample equipment during runoff events. The BTL influent sample was collected manually at INF-01 following each storm event. Unfortunately, major upgrades to the BTL were being conducted during the time of this collection and higher than normal variability was experienced.

The bench-scale evaluation storm water sampling was added to the Butte Hill DSWMP on July 30, 2013, and efforts continued until sufficient data had been obtained for the evaluation. During this time, 4 storm events produced runoff in both BG and MSD as shown in Table C-3. Because Storm Event 2 did not produce runoff at MSD-3A, only Storm Event 1, Storm Event 3, Storm Event 4, and Storm Event 5 were evaluated within this Technical Report. Collection of storm water samples for the bench-scale evaluation ceased on September 17, 2013.

TREC collected 5 liters of storm water from each of the specified storm water sample locations and 20 liters from the BTL influent flow location. Field parameters were not measured on the storm water samples. To characterize the runoff from each storm event, the storm water samples were shaken to re-suspend any sediment, subsampled, and analyzed within the allowable holding times for the constituents specified in the Butte Hill DSWMP by Pace Analytical Services, Inc. (Pace) in Minneapolis, Minnesota. The remainder of the storm water samples were refrigerated until the bench-scale evaluation was completed.

The storm water samples were analyzed for total recoverable and dissolved metals including arsenic, cadmium, copper, lead, and zinc (the constituents of concern [COCs]) according to EPA Method 200.8. In addition to the COCs and work plan requirements, the storm water samples were analyzed for alkalinity and chloride according to EPA Method 2320B and SM4500Cl-E.

2.2 Bench-Scale Reactors at Typical Butte Treatment Lagoon Lime Dosages

The bench-scale evaluation parameters and methods were designed to simulate the BTL treatment system in a bench-scale environment and evaluate the influence of mixing up to 200 gpm of storm water with the BTL influent. The bench-scale testing was completed over the expected range of storm water concentrations. Based on the addition of 200 gpm of storm water to the 2014-observed BTL average influent flow of 1,273 gpm, the storm water concentration within the influent flow was approximately 15% of the average BTL influent flow. The bench-scale evaluation tested 5 permutations of storm water mixtures with the BTL influent, as shown in Table C-4, based on potential storm water concentrations. In addition to the storm water mixtures, 2 additional bench-scale reactors were tested in the same manner as the storm water mixtures: 1 containing 100% BTL influent water and 1 containing deionized (DI) water.

A single dose of 62.5 mg of hydrated lime was added to each bench-scale reactor containing 500 milliliters (mL) of the test mixture. The lime concentration was based on a typical BTL lime addition rate of 125 mg/L. A consistent lime concentration was chosen for the bench-scale evaluation because operationally it is difficult to adjust the BTL lime addition rate for abrupt changes in conditions. The bench-scale reactors were hand swirled to distribute the lime within the test vessel and then each vessel was loosely covered and allowed to rest for a reaction period of 4 days. After the reaction period, the temperature and pH were measured within each bench-scale reactor prior to collecting a sample for laboratory analysis.

Following the 4-day reaction period, each bench-scale reaction vessel was sampled for laboratory analysis. A 250-mL sample was decanted from the reaction vessel to separate the sample from the settled precipitate to simulate the actual precipitation that occurs in the lagoon cells. However, simulating the actual dynamic process of settling precipitated metals in the lagoon cells and the effect on water quality are difficult to replicate in a laboratory environment. The decanted samples were preserved and submitted to Pace for total recoverable metals analysis using EPA Method 200.8 and EPA Method 245.1.

3.0 STORM WATER EVALUATION RESULTS

The results of the storm water treatment bench-scale evaluation are included in the following sections. A discussion of the storm water treatment bench-scale evaluation is included in Section 4.0.

3.1 Buffalo Gulch and Metro Storm Drain Storm Water Evaluation Analysis

Precipitation events can vary widely across Butte in intensity, location, and duration. The National Oceanic and Atmospheric Administration (NOAA) Quality Controlled Local Climatological Data (QCLCD) database provided hourly precipitation data for the storm events for the station at the Bert Mooney Airport, which is located approximately 3 miles from the BG and MSD storm water sample locations. For comparison, the precipitation data was compared to BPSOU site-wide data collected from the Butte-Silver Bow (BSB) county shop, BTL/LAO, and the Kelley Mine as shown in Table C-5.

The analytical results for the BG storm water analysis and the MSD storm water analysis are included in Table C-6 and Table C-7, respectively. As alkalinity values were not available for the exact storm event days, the average BTL Influent was determined by averaging the routine monitoring samples from the days nearest to the storm event. Two routine BTL influent samples were collected near the storm events analyzed for alkalinity. On August 12, 2013, the BTL influent alkalinity was 77.8 mg/L and on September 23, 2013, it was 95.2 mg/L, for an average BTL influent alkalinity of 86.5 mg/L. The complete storm water analytical results are included in Appendix C-2 and the complete Pace laboratory reports are included in Appendix C-3.

3.2 Bench-Scale Reactors at Typical Butte Treatment Lagoon Lime Dosages

Each bench-scale reactor was performed in duplicate. For simplification, the results of the duplicate series were averaged. The average reactor concentration of total recoverable metals following the addition of 125 mg/L hydrated lime and the 4-day reaction are included Table C-8. The complete analytical results are included in Appendix C-2 and the complete Pace laboratory reports are included in Appendix C-3.

4.0 DISCUSSION OF RESULTS

The following sections discuss the results of the storm water treatment bench-scale evaluation.

4.1 Storm Water Sample Analysis

As previously described, the precipitation events can vary widely across Butte in intensity, location, and duration, which can result in variability in the runoff flow and chemistry. During the bench-scale evaluation, the storm water samples collected from BG were typically higher in all total recoverable metals, while the samples collected from the two storm water sources were generally similar in dissolved metals concentrations.

The average COCs from the 4 storm water events were compared with the BTL influent samples to determine if the surface water differed from the typical groundwater component being treated

within the BTL system. The largest variation within each storm water source and between the different basins was in the total alkalinity results. The total alkalinity of BG ranged from 57.5 mg/L to 91.8 mg/L with an average of 78.5 mg/L, whereas the total alkalinity of MSD ranged from 29.5 mg/L to 98.8 mg/L with an average of 57.3 mg/L. The average storm water alkalinities are lower than the BTL influent alkalinity, which averaged 86.5 mg/L during the bench-scale evaluation and 110.0 mg/L in 2014. In general, the storm water sources also varied significantly from several of the BTL influent total recoverable metals concentrations. The BTL influent, which is mainly composed of groundwater, contained higher concentrations of both total recoverable cadmium and zinc when compared to the storm water sources. However, the storm water source samples contained much higher concentrations of total recoverable lead when compared to the BTL influent.

4.2 Analytical Results of Bench-Scale Reactors at Typical Butte Treatment Lagoon Lime Dosages

The initial results of the bench-scale evaluation indicate that the addition of 125 mg/L of hydrated lime to the bench-scale reactors reduced the total recoverable metals concentrations below the BTL discharge targets. However, an approximate 20% increase of arsenic and copper total recoverable concentrations were observed in the 15% BG, 15% MSD, and BG and MSD composite reactors when compared to the BTL influent reactor. The increase in total recoverable metals could indicate a reduction in treatment efficiency of the BTL treatment system as a result of the storm water addition; however, this observation was not observed consistently with the 7.5% mixtures.

The bench-scale BTL influent reactors did not correlate well with the 2014 BTL average effluent data. This observation supports the view that the BTL system is complex and therefore difficult to simulate in a laboratory environment because treatment is composed of chemical precipitation, absorption of carbon dioxide (CO_2), and physical separation of solids. The bench-scale reactor results included within Table C-8 show most analyte concentrations (with the exception of cadmium and zinc) are lower than are typically achieved under field conditions, stressing that the chemistry-only bench-scale evaluations are optimistic.

The pH values measured after the 4-day hydrated lime reaction period did not correlate to the typical conditions observed at the BTL. The average pH within the reactors at the end of the 4-day reaction period was 8.23 standard units (S.U.), whereas the 2014 average BTL effluent pH was 9.27 S.U. These results indicate that the bench-scale carbon dioxide (CO_2) absorption and equilibration was much more complete when compared to what can be achieved in the actual BTL system. The conversion of calcium hydroxide [$Ca(OH)_2$] and CO_2 to calcium carbonate ($CaCO_3$) is an important reaction for precipitating and settling metals in BTL water, and follows the equation below:

$$Ca(OH)_2 \text{ dissolved} + CO_2 \text{ air} \rightarrow CaCO_3 \text{ precipitation as sludge.}$$

It is possible that the bench-scale system allowed much better sorption of carbon dioxide (CO_2) from the air and allowed the system to completely precipitate dissolved calcium hydroxide [$Ca(OH)_2$] to calcium carbonate ($CaCO_3$). The equilibrium pH of calcite ($CaCO_3$) in water is pH 8.2. Allowing the bench-scale reactions to go to full completion resulted in lower pH values and

likely provided more co-precipitation of metals in the calcium carbonate ($CaCO_3$) matrix and better sedimentation through settling and adherence to the beaker surfaces.

5.0 CONCLUSIONS

After evaluating the results of the bench-scale evaluation, the following conclusions have been observed based on the evaluation of adding 100 to 200 gpm of storm water from BG and/or MSD to the BTL system.

5.1 Bench-Scale Evaluation Timing

The bench-scale evaluation samples were collected from July 30 to September 17, 2013, overlapping the BTL Phase II construction upgrades, which were completed from 2011 to 2014. Portions of the BTL and collection system were likely disturbed during the bench-scale evaluation and the collected data might not accurately represent typical BTL conditions. The effects of construction on the BTL system and water sources could have affected the results and conclusions observed from the storm water addition.

5.2 Storm Water Variability

The storm water flow and chemistry varied significantly throughout the bench-scale evaluation, particularly the total accumulation and alkalinity. Establishing a uniform influent flow to the BTL system is critical to reducing variability in the lime addition rate and maintaining discharge values below the BTL discharge targets. The addition of storm water to the BTL influent might have resulted in an increase in arsenic and copper total recoverable concentrations following hydrated lime treatment, but definitely increased the variability of the BTL influent and likely increased the chance of exceeding the BTL discharge targets.

5.3 BTL System Capacity

The BTL system has a design capacity of 1,880 gpm and received influent flows up to 1,779 gpm in 2014. Storm water runoff typically occurs during wet weather conditions when the BTL influent flows are typically above average or near the BTL system design capacity. If storm water is to be added to the BTL system, proper infrastructure would need to be added to allow for controlled addition of storm water at a consistent rate with the consideration that the BTL system has capacity available to treat the additional volume of influent.

Furthermore, the addition of 200 gpm of storm water would shorten retention time of the system. A reduction in retention time would reduce the settling time and carbon dioxide (CO_2) uptake which could increase the chances of exceeding the BTL discharge targets. Such system changes were not evaluated during the bench-scale evaluation.

5.4 Recommendations

Further evaluation is required to determine if storm water can be added to the existing BTL treatment system and still maintain the effluent below the discharge target values. This bench study has only evaluated chemical effects. Pilot testing could test for storm water addition effects of hydraulic capacity and sedimentation on discharge water quality.

6.0 REFERENCES

Atlantic Richfield Company, 2013a. Draft Final Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Work Plan. July 18, 2013.

Atlantic Richfield Company, 2013b. Butte Priority Soils Operable Unit (BPSOU) Draft Final Storm Water Quality Best Management Practices Alternative Performance Evaluation Work Plan. May 21, 2013.

Atlantic Richfield Company, 2013c. Addendum: Draft Butte Hill Diagnostic Surface Water Monitoring Plan. February 2013.

DEQ, 2012. Montana Department of Environmental Quality. Circular DEQ-7 Montana Numeric Water Quality Standards. October 2012.

FIGURES

LEGEND:

STORM WATER SAMPLE LOCATIONS

N

DISPLAYED AS:

COORD SYS/ZONE: MSP

DATUM: NAD 83

UNITS: FEET

SOURCE: PIONEER

SCALE IN FEET

0 250 500

FIGURE 1

PIONEER TECHNICAL SERVICES, INC.
1101 SOUTH MONTANA
BUTTE, MONTANA 59701
(406) 782-5177

BTL STORM WATER TREATMENT EVALUATION SAMPLE LOCATIONS

DATE: 07/08/2014

7/10/2014 4:57:24 PM P:\ARCO\BPSOU\STORM WATER TREATMENT EVALUATION\DRAWINGS\BPSOU-SW-PLN-001-14.DWG

TABLES

TABLE C-1
MAXIMUM DESIGNED BTL INFLUENT FLOW RATE

Influent Source	Maximum Design Flow Rate
West Camp[1]	315
MSD[2]	680
Missoula Gulch[3]	270
BRW[3]	235
LAO & HCC Capture[3]	380
Influent Pump Station[4]	1,880

Notes:
[1] West Camp maximum flow based upon Goulds 250L15 submersible pump rate at 3,450 rpm
[2] Metro Storm Drain (MSD) maximum flow based upon parallel operation of existing Ampco E Series Model 4X3C 10 HP pumps
[3] Influent flows were estimated from historic operational data
[4] Influent Pump Station maximum flow based upon the sum of possible influent flows and efficient operation of 75 HP Godwin Dri-Prime® Model CD225M pump

TABLE C-2
BTL DISCHARGE TARGET VALUES

Analyte	Most Stringent Circular DEQ-7 Discharge Target (mg/L)
Arsenic	0.010
Cadmium	0.0008
Copper	0.03
Mercury	0.00005
Lead	0.015
Zinc	0.39
pH	9.5

mg/L: milligrams per Liter.

Notes:

1. The Acute and Chronic Aquatic Life Standards are adjusted for 400 mg/L of total hardness (mg/L as calcium calcite [$CaCO_3$]) as described in DEQ-7.

TABLE C-3
STORM EVENT SAMPLE COLLECTION DATES

Storm Event	Storm Event Date	BG-01 Sampled	MSD-3A Sampled
Storm Event 1	August 1, 2013	Yes	Yes
Storm Event 2	August 22, 2013	Yes	No
Storm Event 3	August 26, 2013	Yes	Yes
Storm Event 4	September 13, 2013	Yes	Yes
Storm Event 5	September 17, 2013	Yes	Yes

BG: Buffalo Gulch. MSD: Metro Storm Drain.

TABLE C-4
STORM WATER BENCH-SCALE EVALUATION TEST MATRIX

Storm Water Mixture	Percent BG-01	Percent MSD-3A	Percent BTL Influent
15.0% Buffalo Gulch	15.0	0.0	85.0
7.5% Buffalo Gulch	7.5	0.0	92.5
15.0% MSD	0.0	15.0	85.0
7.5% MSD	0.0	7.5	92.5
BG and MSD Composite	7.5	7.5	85.0
BTL Influent	0.0	0.0	100.0

BG: Buffalo Gulch. MSD: Metro Storm Drain. BTL: Butte Treatment Lagoon

TABLE C-5
STORM EVENT PRECIPITATION DATA

Storm Event	Storm Event Date	Time	Approximate Duration (hours)	Total Accumulation (inches)			
				NOAA Bert Mooney Airport[1]	BSB County Shop[2]	BTL/ LAO[2]	Kelley Mine[2]
Storm Event 1	August 1, 2013	15:00	2	0.46	0.50	0.72	0.67
Storm Event 2	August 22, 2013	19:00	3	0.04	0.01	0.08	0.22
Storm Event 3	August 26, 2013	18:00	1	0.26	0.12	0.21	0.10
Storm Event 4	September 13, 2013	16:00	3	0.29	0.12	0.86	0.61
Storm Event 5	September 17, 2013	9:00	8	0.42	0.42	0.34	0.43

BSB: Butte-Silver Bow. BTL/LAO: Butte Treatment Lagoon/Lower Area One.

Notes:

1. Hourly precipitation data obtained from the National Oceanic and Atmospheric Administration (NOAA) Quality Controlled Local Climatological Data (QCLCD) database.
2. Daily precipitation data obtained from the BPSOU site wide database.

TABLE C-6
BG STORM WATER ANALYTICAL RESULTS

Storm Event	Arsenic		Cadmium		Copper		Lead		Zinc		Total Alkalinity
	Total Recoverable	Dissolved	Total Recoverable	Dissolved	Total Recoverable	Dissolved	Total Recoverable	Dissolved	Total Recoverable	Dissolved	
BTL Discharge Target	0.010	NA	0.0008	NA	0.03	NA	0.015	NA	0.39	NA	NA
1	0.052	0.0053	0.0059	0.00014	0.56	0.017	0.62	0.0011	2.50	0.025	91.8
3	0.044	0.0053	0.0042	0.00027	0.45	0.035	0.47	0.0029	1.90	0.063	76.5
4	0.063	0.0049	0.0071	0.00017	0.70	0.024	0.85	0.0023	2.60	0.048	88.1
5	0.017	0.0053	0.0012	0.00021	0.13	0.021	0.11	0.0013	0.45	0.051	57.5
Average	0.044	0.0052	0.0046	0.00020	0.46	0.024	0.51	0.0019	1.86	0.047	78.5
Bench-Scale BTL Influent Average	0.059	NA	0.0220	NA	0.72	NA	0.01	NA	5.50	NA	86.5
2014 BTL Influent Average	0.029	NA	0.0201	NA	0.67	NA	0.01	NA	5.47	NA	110.0

BG: Buffalo Gulch. BTL: Butte Treatment Lagoon.

Notes:

1. Values = Exceeded BTL Discharge Target Value
2. All values in mg/L
3. NA = Not Available

TABLE C-7
MSD STORM WATER ANALYTICAL RESULTS

Storm Event	Arsenic		Cadmium		Copper		Lead		Zinc		Total Alkalinity
	Total Recoverable	Dissolved	Total Recoverable	Dissolved	Total Recoverable	Dissolved	Total Recoverable	Dissolved	Total Recoverable	Dissolved	
BTL Discharge Target	0.010	NA	0.0008	NA	0.03	NA	0.015	NA	0.39	NA	NA
1	0.048	0.0083	0.0066	0.00023	0.74	0.0320	0.620	0.0024	2.20	0.022	98.8
3	0.014	<0.0005	0.0009	<0.00008	0.15	0.0002	0.054	0.0002	0.27	<0.005	42.6
4	0.045	0.0070	0.0043	0.00017	0.56	0.0360	0.450	0.0019	1.50	0.021	58.2
5	0.007	0.0071	0.0002	0.00018	0.04	0.0360	0.002	0.0017	0.04	0.035	29.5
Average	0.028	0.0057	0.0030	0.00016	0.37	0.0261	0.281	0.0016	1.00	0.020	57.3
Bench-Scale BTL Influent Average	0.059	NA	0.0220	NA	0.72	NA	0.008	NA	5.50	NA	86.5
2014 BTL Influent Average	0.029	NA	0.0201	NA	0.67	NA	0.01	NA	5.47	NA	110.0

MSD: Metro Storm Drain. BTL: Butte Treatment Lagoon

Notes:

1. Values = Exceeded BTL Discharge Target Value
2. All values in mg/L
3. NA = Not Available

TABLE C-8
BENCH-SCALE REACTOR TOTAL RECOVERABLE METALS CONCENTRATION FOLLOWING 125 MG/L HYDRATED LIME ADDITION AND 4-DAY REACTION PERIOD

Test Series	Total Recoverable Metals After 4-day Reaction Period					pH
	Arsenic	Cadmium	Copper	Lead	Zinc	
BTL Discharge Target	0.0100	0.0008	0.0300	0.0200	0.3900	9.50
Average 15% BG	0.0022	0.0012	0.0136	0.0003	0.1806	8.21
Average 7.5% BG	0.0020	0.0011	0.0109	0.0002	0.1548	8.22
Average 15% MSD	0.0022	0.0011	0.0134	0.0003	0.1489	8.23
Average 7.5% MSD	0.0020	0.0011	0.0132	0.0002	0.1700	8.26
Average BG and MSD Composite	0.0022	0.0011	0.0138	0.0003	0.1709	8.22
Average Bench-Scale BTL Influent	0.0017	0.0012	0.0112	0.0001	0.1945	8.26
2014 BTL Effluent Average	0.0036	0.0002	0.0096	0.0007	0.0403	9.27

BG: Buffalo Gulch. MSD: Metro Storm Drain. BTL: Butte Treatment Lagoon

Notes:

1. Values = Exceeded BTL Discharge Target Value
2. All values in milligrams/Liter (mg/L)

APPENDIX C-1

PHREEQC MODELING OF NEUTRALIZATION OF STORM WATER BLENDS AND GROUNDWATER FOR THE LIME TREATMENT OF WATER AT BUTTE, MT

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

PHREEQC MODELING OF NEUTRALIZATION OF STORMWATER BLENDS AND GROUNDWATER FOR THE LIME TREATMENT OF WATER AT BUTTE, MT

GEOCHEMICAL MODELING OF BLENDS USING PHREEQC

PHREEQC (Parkhurst and Appelo, 2009; Parkhurst and Appelo, 2013) modeling software was used to simulate neutralization of blends of BTL groundwater and storm-water from runoff (Fall 2013) into Buffalo Gulch and the MSD. The PHREEQC model use and design, model inputs, and treatment system simulations are described in this section. The PHREEQC modeling results provide a preliminary assessment of potential water treatment system performance, and are intended to support additional design-related studies and evaluations, including bench- and pilot-scale testing planned for 2014. The conceptual design and expected performance of the lime treatment facility for storm water blended with groundwater and other possible source waters will continue to be evaluated and refined based on the results of ongoing studies.

Overview of Model Use and Design--PHREEQC

PHREEQCI Version 2.15 (Parkhurst and Appelo 2013) software is a graphical user interface to the PHREEQC geochemical model (Parkhurst and Appelo 1999) used to simulate chemical reactions and transport processes in natural or contaminated water. PHREEQCI provides all of the capabilities of the stand-alone geochemical model PHREEQC. PHREEQC is based on an ion-association aqueous model and has capabilities for the following:

1. Speciation and saturation-index calculations using current published thermodynamic data;
2. Batch-reaction and one-dimensional transport calculations involving reversible reactions (including aqueous, mineral, gas, solid-solution, surface-complexation, and ion-exchange equilibria) and irreversible reactions (including specified mole transfers of reactants, kinetically controlled reactions, mixing of solutions, and temperature changes); and
3. Inverse modeling, which finds sets of mineral and gas mole transfers that account for differences in composition between waters, within specified compositional uncertainty limits.

PHREEQC is applied in this task to simulate blending of storm water and collected groundwater followed by hydrated lime neutralization expected to occur after blending of the aqueous solutions. Absorption of atmospheric CO_2 and CO_2 added physically to the lime treated aqueous solutions in the detention ponds at LAO are also simulated to assess pH values of the treated waters to ensure that they meet or exceed the permitted pH of 9.2 S.U. prior to discharge to Silver Bow Creek.

PHREEQC Model Input

Recent applied research on the chemistry of the various input waters, geochemistry of the lime neutralization process, and subsequent chemistry of waters in the settling ponds have led to development of a more robust model of the neutralization reaction that accounts for mineral solubilities, adsorption of metals onto precipitated iron phases, co-precipitation of metals Cu and Zn with mg-calcite, and inclusion of trace elements of concern as a solid solution in the resulting mg-calcite sludge. The PHREEQC-based model in combination with bench-scale testing of lime neutralization of various blends of storm water with the existing BTL waters provide a sound basis for planning and managing the BTL treatment system and the Upper Silver Bow Basin storm water.

The PHREEQC model input, including influent flow and chemistry, the specific "steps" to be modeled, neutralization with hydrated lime, calcite sludge precipitation (solids formation), effluent water chemistry following chemical (lime) addition, and absorption of CO_2 as the effluent flows through the detention ponds, can assist the evaluation of treatment of various blends of storm water and groundwater as described below.

Influent Flow and Chemistry

The following water treatment scenarios were evaluated for storm waters collected in the Fall 2013:

- 100% BTL water;
- Blend of 7.5% Buffalo Gulch water, 7.5% MSD water with 85% BTL water;
- Blend of 7.5% Buffalo Gulch water with 92.5% BTL water;
- Blend of 15% Buffalo Gulch water with 85% BTL water;
- Blend of 7.5% MSD water with 92.5% BTL water;
- Blend of 15% Buffalo Gulch water with 85% BTL water.

The estimated influent water flows and chemistries associated with each of the above modeling scenarios are described in subsequent sections.

Modeling Steps and Assumptions

The PHREEQC models developed for each of the modeling scenarios included the following general treatment/modeling steps:

- Step 1 - Calculation of mineral saturation states for the influent water chemistries and blends; analyses were incomplete and some waters were missing major anions such as sulfate and bicarbonate; cation/anion balances for both storm waters were large (Table 1) and outside of

acceptable quality control, but the blends generally had acceptable cation/anion balances of less than +10% error;

- Step 2 – Calculation of mineral saturation states of the blended waters;
- Step 3 - Addition of lime, with the neutralization reaction controlled stepwise by a specified lime consumption rate; in all models the same amount of lime was added to each blend;
- Step 4 - Equilibration with mineral phases and sorption of metals onto precipitated iron and aluminum hydroxides;
- Step 5 – Co-precipitation/solid solution of trace metals with carbonates as Mg-calcite using adjusted stoichiometry;
- Step 6 – Calculation of solution concentrations and pH;
- Step 7 – Absorption of CO_2 to lower pH to discharge permit levels (detention ponds simulations); the same amount of CO_2 was used for each model.

The following assumptions were made globally for the PHREEQC modeling completed for the treatment systems:

- Mg-calcite with Cd,Cu, and Zn in solid solution was not set initially at its phase boundary, so calcite precipitation was not allowed in the model until after lime addition and sorption processes occurred;
- The systems were modeled as “open” and in equilibrium with atmospheric oxygen
- All ferrous iron in the input water is oxidized to ferric iron during the lime addition; and
- CO_2 was added to the neutralized solutions in 3 steps after calcite equilibrium was achieved to simulate the uptake of CO_2 in the retention ponds 1, 2, & 3 prior to discharge to Silver Bow Creek.

RESULTS AND DISCUSSION

Storm water samples and BTL water samples that were collected from August 6 through September 26, 2013 during 5 storm events, were analyzed and used for blending and bench-scale testing as previously discussed. BTL waters and the storm water samples from Buffalo Gulch and the MSD were similar at each location for the 5 total storm events. Therefore, it was possible to simplify the modeling effort by using one set of average chemical data for each source water that were that had sufficiently complete chemical analyses for use. The BTL and storm water data used in the model are shown in Table 1. The piper diagram in Figure 1 indicates that both of the storm waters are calcium-bicarbonate dominated, andthe BTL water is calcium sulfate dominated. Calculated dissolved solids for Buffalo Gulch and MSD storm waters were 373 and 250 mg/L, respectively, and BTL input water was 797 mg/L.

PHREEC modeling results for pH are shown on Table 2 and Figure 2. Because pH is the most critical parameter in the lime addition process, that is the principal parameter discussed below.

In Figure 2, the first 3 sets of bars represent the pH values of each of the 3 source waters. The next 6 sets of bars represent the steps calculating pH in the reaction models for BTL water and the 5 blended waters. In the mixing step, the pH values of the blends and mineral saturation states were determined in the model. Lime addition and subsequent Mg-calcite precipitation produced pH values for each of the treated solutions. The pH value for the 100% BTL treatment was comparable to the present daily lime treatment of groundwater resulting in a pH of 10.50 immediately after lime addition (Table 2). The pH then decreases to 10.11 (Table 2) as Mg-calcite precipitates. With the stepwise addition of CO_2, the pH decreases to 9.26 in the second step of the 3 step CO_2 addition, reaching a pH of 8.68 with the third step CO_2 addition, acceptable for discharge from the ponds to Silver Bow Creek.

The lime addition model of the composite blend of 85% BTL groundwater, 7.5% Buffalo Gulch storm water, and 7.5% MSD storm water, the pH values in each step of the model are lower than those of the 100% BTL model, reaching 9.17 in step 1 of the CO_2 addition.

For the BTL groundwater and Buffalo Gulch storm water blends, the pH values are similar to the composite, decreasing to 8.69 SU at Step 2 of the CO_2 addition for BG 7.5 and 8.36 at Step 2 of the CO_2 addition for BG 15 (Table 2). This indicates that similar amounts of lime could be used in these blends to achieve the results observed in the 100% BTL model. These results are similar to the pH results of the MSD blends, which were significantly greater than any of the other pH values for BTL groundwater and other blends throughout the reaction processes of the models (Figure 2). The pH of the 7.5% and 15% MSD blends with BTL water were 9.13 and 8.98 SU at step 2 of the CO_2 addition. This indicates that the two MSD blends were similar to the Composite and Buffalo Gulch blends, but the lower alkalinity of the MSD storm water (Table 1.) produced slightly higher pH results at each step of the PHREEQC models than the Buffalo Gulch blends.

The final pH values of each model are sensitive to the initial alkalinity of each of the blended waters and the mixing proportions of BTL water and storm water. Table 1 shows the alkalinities estimated for each of the starting waters, with alkalinities of 86.5, 78.5, and 57.3 mg/L as $CaCO_3$ for BTL water, Buffalo Gulch storm water, and MSD storm water, respectively. A composite blend of groundwater and storm water, like the one modeled in this exercise might require a small adjustment to the amount of lime added. Blends containing groundwater blended with Buffalo Gulch storm water might require slightly more lime addition to achieve the desired high initial pH (~10.5). Blends containing groundwater blended with MSD storm water might require little or no addition of lime added.

The trace metals of concern, cadmium, copper, and zinc, are relatively high in concentrations in the storm waters and the BTL water. In the lime treatment process, these metals are predominantly removed from the aqueous phase by increasing pH with hydrated lime then

precipitating as solid solutions in a magnesium calcite precipitate (approximately 0.95/0.04 Ca/Mg mole ratio) that forms as sludge in the upper detention ponds. Previous investigation (R.W. Lee, 2012, written commun.) showed a typical calcite precipitate in sludge from the upper lagoons to contain about 4% magnesium and trace amounts of iron, manganese, cadmium, copper, and zinc. Stoichiometry for the solid solution calcite in sludge deposits at the LAO were modeled for magnesium, copper, and zinc uptake in 2012 (R.W. Lee, 2012 written commun.) using the formula

$Ca.9490Mg.0400Cu.005Zn.0060(CO_3)$.

Cadmium was not included in the solid solution because it was attenuated in other solid precipitates in the model. Because copper and zinc in the aqueous phase can be taken up by the precipitating calcite in a solid solution, there is variability in the stoichiometry of the metals in this calcite sludge that is determined by the initial concentrations of the metals in the BTL/Storm-water mixes. It was necessary to vary the Mg-calcite stoichiometry to accommodate the variances of the metals in the BTL/Storm-water mixes and maintain metals concentrations at or near typical concentrations in the detention ponds and at discharge that are below permitted concentrations. The calcite (sludge) stoichiometry is provided for each of the models below. Note that only the magnesium, copper, and zinc were adjusted for each model to simplify and maintain charge balance.

100% BTL	$Ca.9490Mg.03761Cu.00841Zn.00498(CO_3)$
Composite Blend	$Ca.9490Mg.03845Cu.00757Zn.00498(CO_3)$
BG 7.5	$Ca.9490Mg.03815Cu.00792Zn.00493(CO_3)$
BG 15	$Ca.9490Mg.03841Cu.00752Zn.00507(CO_3)$
MSD 7.5	$Ca.9490Mg.03796Cu.00804Zn.0050(CO_3)$
MSD 15	$Ca.9490Mg.03833Cu.00767Zn.0050(CO_3)$

The complete set of model inputs to PHREEQC are provided in Appendix A.

Results of cadmium, copper, and zinc concentrations in the PHREEQC model are provided for each reaction step in Tables 3-5 and are shown graphically in Figures 3-5.

Cadmium concentrations in storm-water mixes ranged from 0.0024 to 0.0027 mg/L with Buffalo Gulch having the greatest concentration of cadmium at 0.0046 mg/L. (Table 3 & Figure 3). Following lime treatment and residence time through the simulated ponds for CO_2 uptake, model results for cadmium concentrations ranged from 0.00025 to 0.00035 mg/L.

Copper concentrations in storm-water mixes and the BTL water ranged from 0.76 to 0.88 mg/L with BTL water having the greatest concentration of copper at 0.88 mg/L (Table 3 & Figure 3).

Following lime treatment and residence time through the simulated ponds for CO_2 uptake, model results for copper concentrations ranged from 0.0011 to 0.0017 mg/L.

Zinc concentrations in storm-water mixes ranged from 05.11 to 5.75 mg/L (Table 3 & Figure 3). Following lime treatment and residence time through the simulated ponds for CO_2 uptake, model results for zinc concentrations ranged from 0.0018 to 0.0042 mg/L. The higher concentrations of zinc were mostly precipitated from the aqueous phase in the lime addition step, with additional removal by the calcium carbonate precipitation (sludge) as part of the calcite solid solution.

RECOMMENDATIONS

Additional storm-water samples should be collected at a later date in 2014 for better and more complete datasets of major cations and anions, metals, pH, temperature, and silica to verify that results of this PHREEQC modeling are appropriate. Therefore, a second round of PHREEQC modeling, bench scale testing, and lab analyses should be carried out on additional storm-water samples and calcite sludges that occur from the lime neutralization process to validate this approach and test its validity for other storm events, some at other times of the year, that might be significantly different from the storm-water runoff events modeled in this report. Owing to the lower concentrations of cations and anions in storm water runoff, stronger quality assurance and quality control on the storm-water sampling and analyses should be asserted on these samples, including a very complete list of analytes, more replicates, monitoring of cation/anion balances when the interim data are received, and requesting reruns of selected parameters as needed to achieve cation/anion balances within the +/- 5% range.

REFERENCES

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Parkhurst, D.L. and Appelo, C.A.J., 1999, User's guide to PHREEQC (Version 2)—A computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations: U.S. Geological Survey Water-Resources Investigations Report 99-4259, 310 p.

Parkhurst, D.L., and Appelo, C.A.J., 2013, Description of input and examples for PHREEQC version 3—A computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations: U.S. Geological Survey Techniques and Methods, book 6,chap. A43, 497 p.

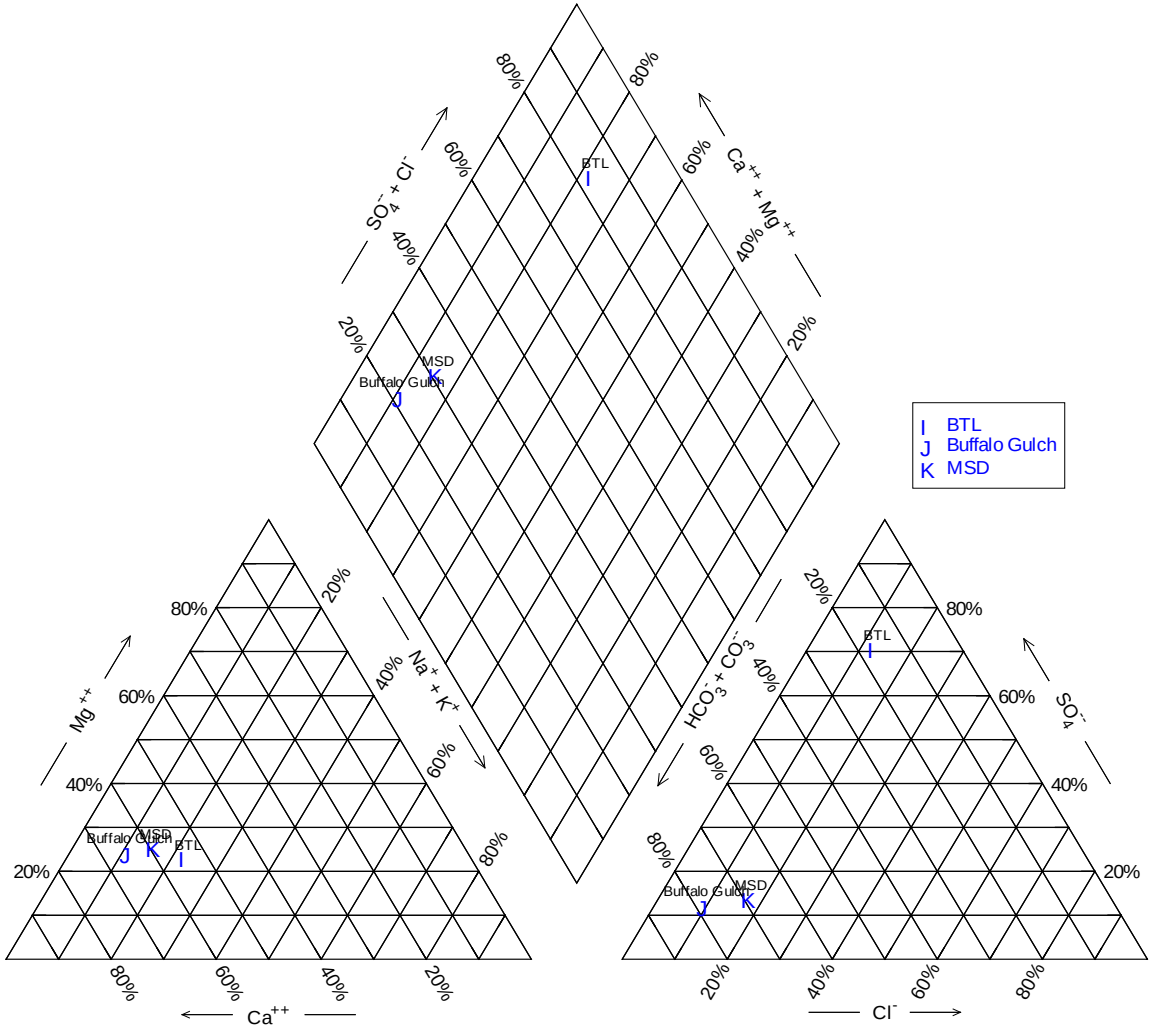

Figure 1. Piper Diagram of Source Waters Used for Blending

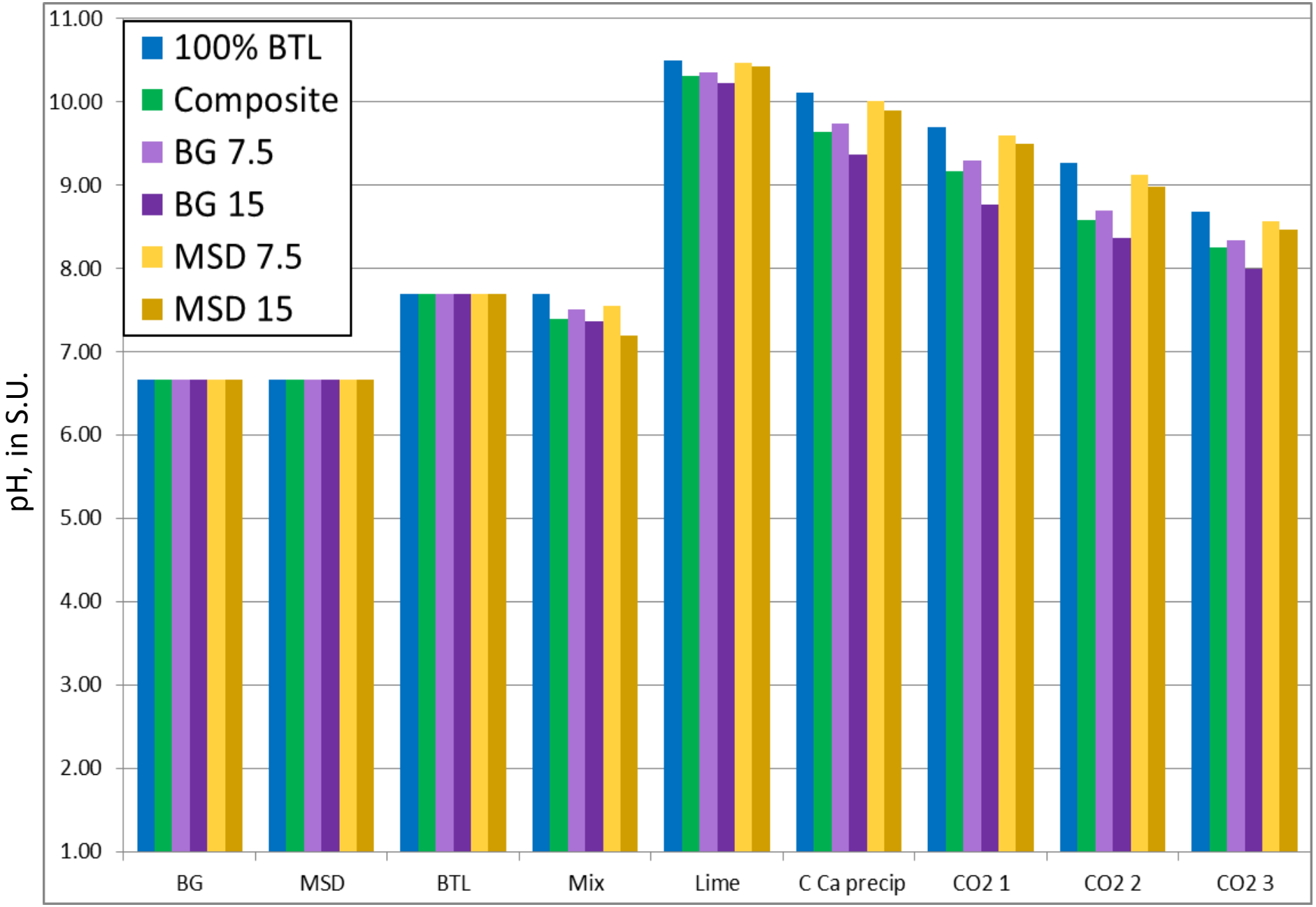

Figure 2. pH Values for Influent Waters, Mixes, and Model Steps

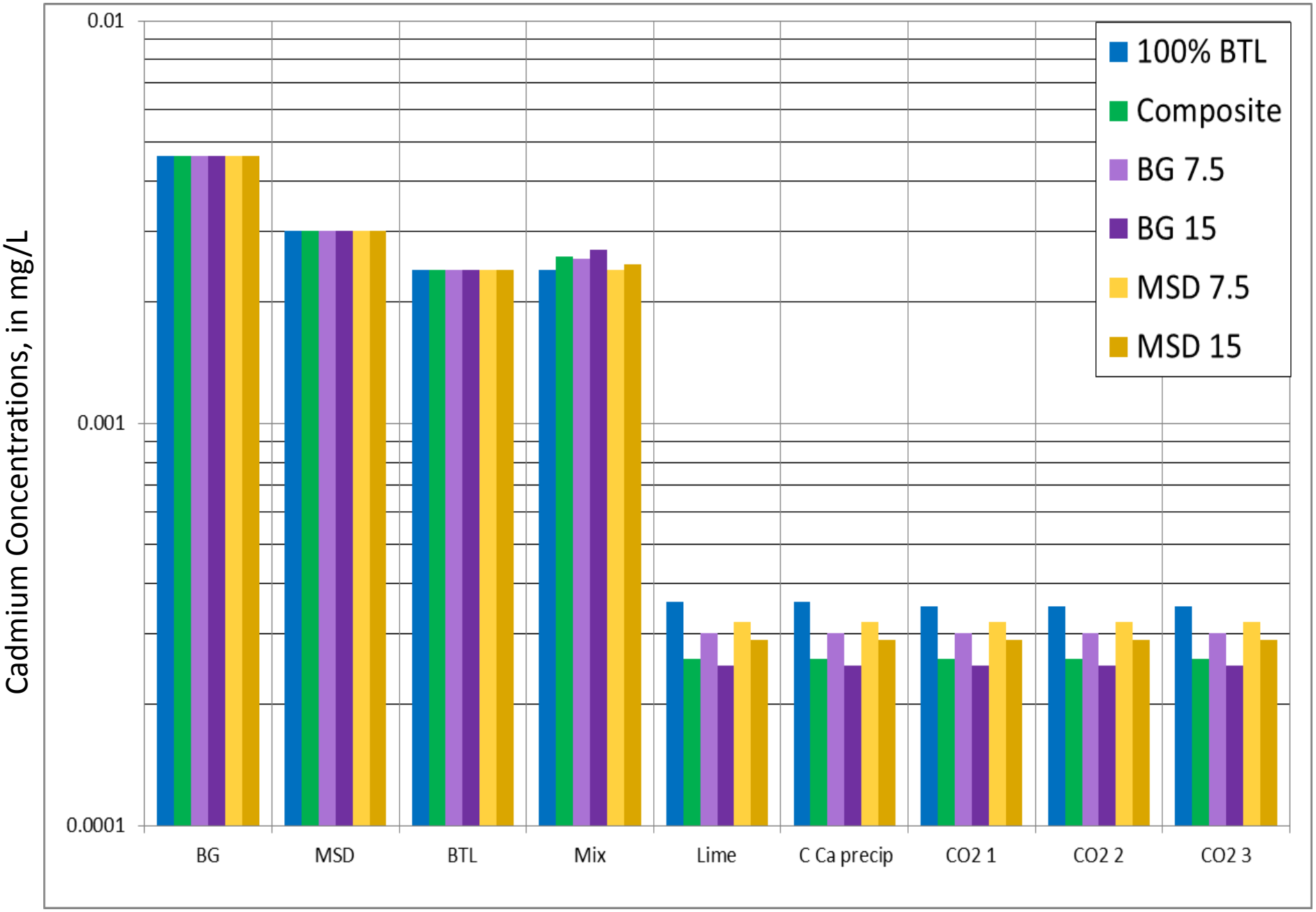

Figure 3. Cadmium Concentrations for Influent Waters, Mixes, and Model Steps

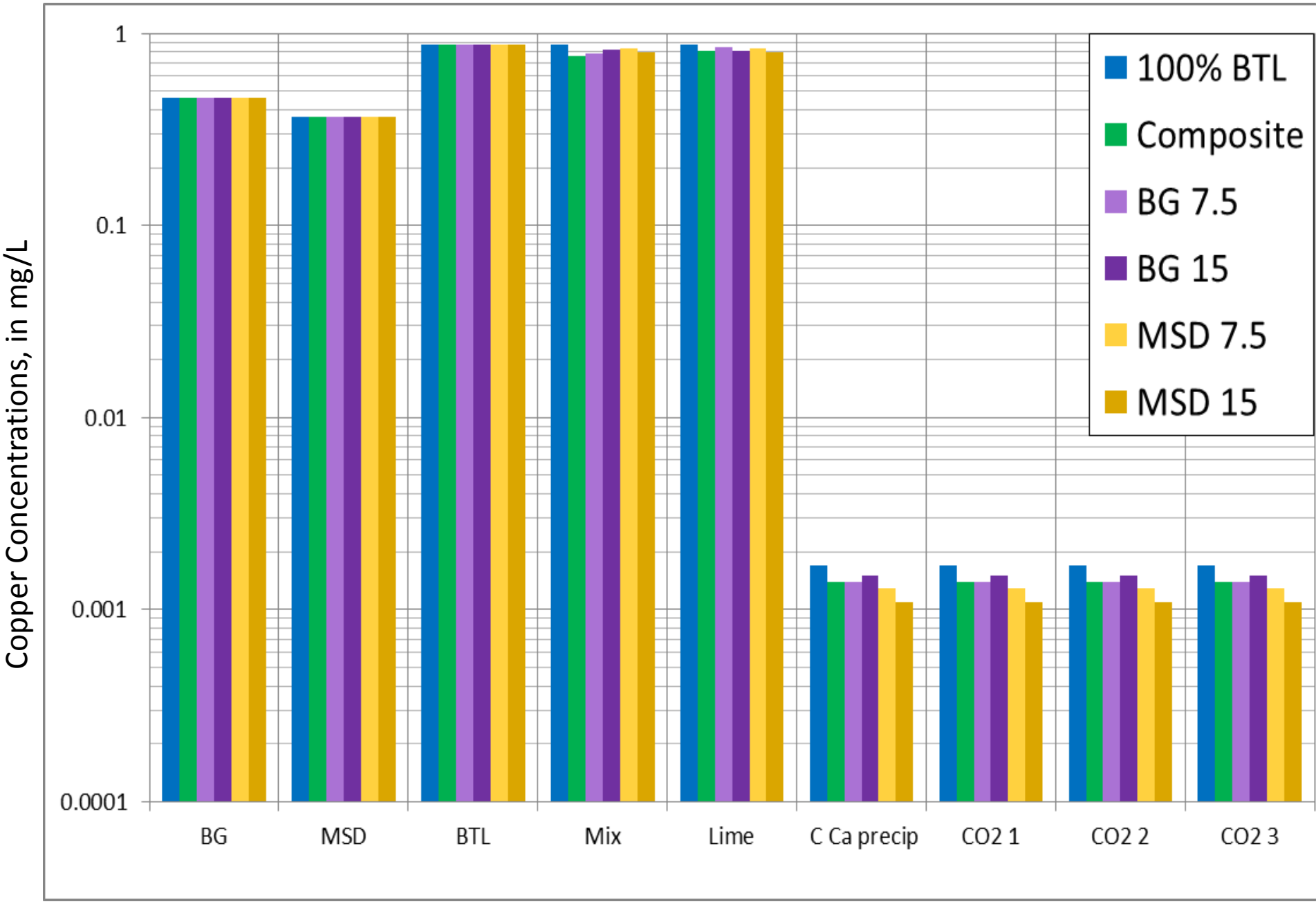

Figure 4. Copper Concentrations for Influent Waters, Mixes, and Model Steps

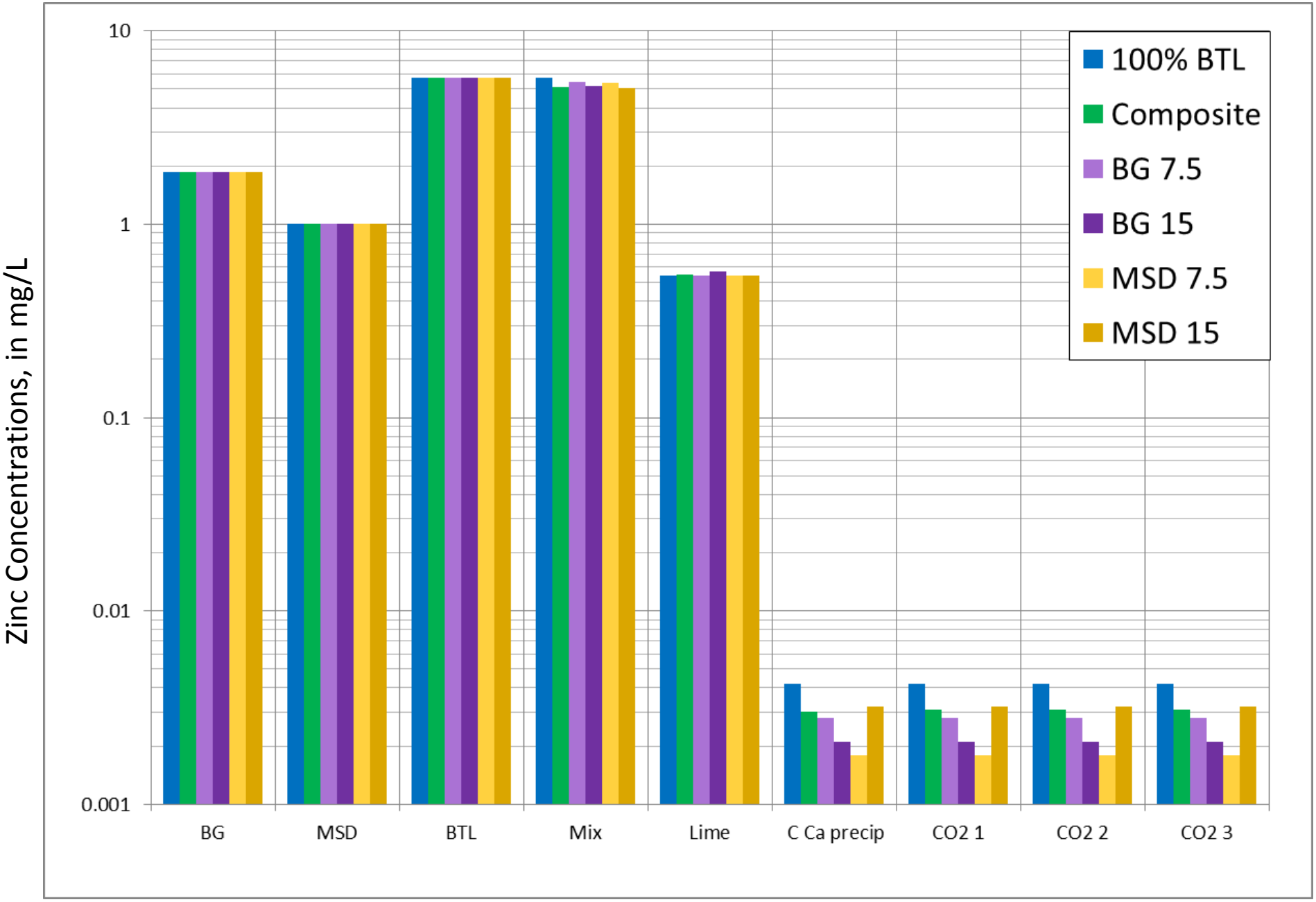

Figure 5. Zinc Concentrations for Influent Waters, Mixes, and Model Steps

Table 1. BTL Water and Storm Water Sources (averaged)

(concentrations in mg/L unless otherwise stated)

Sample ID	BTL	Buffalo Gulch	MSD
pH, in Standard Units	7.70	6.66	6.66
Temperature, in ^{o}C	15	15	15
Al+++	0.41	0.1	0.1
Ca++	121	57.6	30
Cd++	0.0015	0.0027	0.0009
Cl-	50	7	10.3
SiO2(aq)	31.4	100	61
Fe++	5.2	24	10
Fe+++	0.1	0.1	0.1
Alkalinity as CaCO3	86.5	78.5	57.3
Mg++	31.9	13.2	8
Mn++	4.85	2.7	0.88
NO3-	3.984	4.869	5.755
K+	8.7	8.6	7.4
Na+	54.1	6.5	4.7
SO4--	369	11.9	11.4
Zn++	5.75	1.86	1
Cu++	0.88	0.46	0.37
TDS (calculated)	797.4	373.2	249.5
Charge imbalance, in eq/L	8.58E-04	3.38E-03	1.21E-03
Charge imbalance error, in %	4.5%	45.6%	25.9%

Table 2. Model Data for pH

Steps	100% BTL	Composite	BG 7.5	BG 15	MSD 7.5	MSD 15
BG	6.66	6.66	6.66	6.66	6.66	6.66
MSD	6.66	6.66	6.66	6.66	6.66	6.66
BTL	7.70	7.70	7.70	7.70	7.70	7.70
Mix	7.70	7.39	7.51	7.36	7.55	7.20
Lime	10.50	10.31	10.35	10.22	10.46	10.42
C Ca precip	10.11	9.64	9.74	9.36	10.01	9.90
CO2 1	9.70	9.17	9.30	8.76	9.60	9.49
CO2 2	9.26	8.58	8.69	8.36	9.13	8.98
CO2 3	8.68	8.25	8.34	7.99	8.57	8.47

Table 3. Model Data for Cadmium

Steps	100% BTL	Composite	BG 7.5	BG 15	MSD 7.5	MSD 15
BG	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
MSD	0.003	0.003	0.003	0.003	0.003	0.003
BTL	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024
Mix	0.0024	0.0026	0.00256	0.0027	0.0024	0.00248
Lime	0.00036	0.00026	0.0003	0.00025	0.00032	0.00029
C Ca precip	0.00036	0.00026	0.0003	0.00025	0.00032	0.00029
CO2 1	0.00035	0.00026	0.0003	0.00025	0.00032	0.00029
CO2 2	0.00035	0.00026	0.0003	0.00025	0.00032	0.00029
CO2 3	0.00035	0.00026	0.0003	0.00025	0.00032	0.00029

Table 4. Model Data for Copper

Steps	100% BTL	Composite	BG 7.5	BG 15	MSD 7.5	MSD 15
BG	0.46	0.46	0.46	0.46	0.46	0.46
MSD	0.37	0.37	0.37	0.37	0.37	0.37
BTL	0.88	0.88	0.88	0.88	0.88	0.88
Mix	0.88	0.76	0.79	0.82	0.84	0.80
Lime	0.88	0.81	0.85	0.81	0.84	0.80
C Ca precip	0.0017	0.0014	0.0014	0.0015	0.0013	0.0011
CO2 1	0.0017	0.0014	0.0014	0.0015	0.0013	0.0011
CO2 2	0.0017	0.0014	0.0014	0.0015	0.0013	0.0011
CO2 3	0.0017	0.0014	0.0014	0.0015	0.0013	0.0011

Table 5. Model Data for Zinc

Steps	100% BTL	Composite	BG 7.5	BG 15	MSD 7.5	MSD 15
BG	1.86	1.86	1.86	1.86	1.86	1.86
MSD	1	1	1	1	1	1
BTL	5.75	5.75	5.75	5.75	5.75	5.75
Mix	5.75	5.11	5.46	5.17	5.40	5.04
Lime	0.54	0.55	0.545	0.57	0.54	0.54
C Ca precip	0.0042	0.003	0.0028	0.0021	0.0018	0.0032
CO2 1	0.0042	0.0031	0.0028	0.0021	0.0018	0.0032
CO2 2	0.0042	0.0031	0.0028	0.0021	0.0018	0.0032
CO2 3	0.0042	0.0031	0.0028	0.0021	0.0018	0.0032

```
TITLE Butte Treatment, BTL 100%
PHASES
MetalCalcite
 Ca.9490Mg.03761Cu.00841Zn.00498(CO3) = CO3-2 + .9490Ca+2 + .03761Mg+2 + .00841Cu+2 +
.00498Zn+2
 log_k           -8.480
 delta_h -2.297 kcal
Al(OH)3(a)
 Al(OH)3 + 3H+ = Al+3 + 3H2O
 log_k 10.38
 delta_h -27.045 kcal
Schwertmannite
 Fe8O8(OH)6SO4 + 22H+ = 8Fe+3 + SO4-2 + 14H2O
 log_k 18
 delta_h 0 kcal
SOLUTION_MASTER_SPECIES
    Slurry        Slurry           0     Slurry          74
SOLUTION_SPECIES
 Slurry  = Slurry
 log_k 0
RATES
Slurry_dissolution
-start
10 k = 1/(5*60)  # sec^-1 (5 minute half life)
20 rate = k * TOT("Slurry") * (1 - SR("Portlandite"))
30 moles = rate * TIME
40 SAVE moles
-end
END

SOLUTION 1  Buffalo Gulch stormwater
 units mg/l
 pH 6.66
 pe 8.0
 temp 15.0
 K 8.6
 Na 6.5
 Ca 57.6
 Mg 13.2
 Fe(+3) 0.1
 Fe(+2) 24.
 Mn 2.7
 Al 0.1
 Zn 1.86
 S 11.9
 Cl 7.
 Si 100
 Cd 0.0046
 Cu 0.46
 Alkalinity CO3-2 78.5
 N 1.1
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
```

```
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
SOLUTION 2  MSD Stormwater
 units mg/l
 pH 6.66
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 7.4
 Na 4.7
 Ca 30.
 Mg 8.0
 Fe(+3) .1
 Fe(+2) 10.
 Mn 0.88
 Al 0.10
 Zn 1.0
 S 11.4
 Cl 10.3
 Si 61
 Cd 0.003
 Cu 0.37
 Alkalinity CO3-2 57.3
 N 1.3
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX 1
    1    0.5
    2    0.5
SAVE solution 3
END
SOLUTION 4  BTL Input Water
 units mg/l
 pH 7.70
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 8.7
 Na 54.1
 Ca 121
 Mg 31.9
 Fe(+3) .1
 Fe(+2) 5.2
 Mn 4.85
 Al 0.41
 Zn 5.75
 S 369.
 Cl 50
 Si 31.4
 Cd 0.0024
 Cu 0.88
```

```
 Alkalinity CO3-2 86.5
 N 0.9
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX
    3    0.
    4    1.
SAVE solution 5
END
TITLE Add Ca(OH)2
USE solution 5
REACTION 1
 Slurry 1
 0.042 moles
SAVE solution 6
END

TITLE kinetic reaction, equilibrium with surface, minerals, and gases
USE solution 6

INCREMENTAL_REACTIONS

KINETICS 1
Slurry_dissolution
    -formula  Slurry -1 Ca(OH)2  1
    -m        10
    -m0       10
    -tol      1e-008
-steps       10 in 5 steps # seconds
-step_divide 1
-runge_kutta 3
-bad_step_max 500

EQUILIBRIUM_PHASES
# Basaluminite 0 0
# Alunite 0 0
# Jurbanite 0 0
# Al(OH)3(a) 0 0
  Gibbsite    0     0
# Calcite 0 0
 Cu(OH)2 0 0
# Epsomite 0 0
 Fe(OH)3(a) 0 0
 Zn(OH)2-b 0 0
# Gypsum 0 0
 O2(g)  -0.7  10
# CO2(g) -3.45
 SiO2(a) 0       0

SURFACE 1
    -sites DENSITY
```

```
    Hfo_sOH Fe(OH)3(a)       equilibrium_phase 0.005   50000
    Hfo_wOH Fe(OH)3(a)       equilibrium_phase 0.2
SAVE solution 7
END

TITLE Equilibrate MetalCalcite
USE solution 7
EQUILIBRIUM_PHASES
# CO2(g) -6.5
 Gibbsite    0     0
 MetalCalcite 0 0
 SiO2(a) 0       0
SAVE solution 8
END

TITLE Titrate CO2
USE solution 8
REACTION 1
    CO2(g)     1
    .00039 moles in 3 steps
SAVE solution 9
END
```

```
TITLE Butte Treatment, Mix Stormwater 15% BTL 85%
PHASES
MetalCalcite
 Ca.9490Mg.03845Cu.00757Zn.00498(CO3) = CO3-2 + .9490Ca+2 + .03845Mg+2 + .00757Cu+2 +
.00498Zn+2
 log_k           -8.480
 delta_h -2.297 kcal
Al(OH)3(a)
 Al(OH)3 + 3H+ = Al+3 + 3H2O
 log_k 10.38
 delta_h -27.045 kcal
Schwertmannite
 Fe8O8(OH)6SO4 + 22H+ = 8Fe+3 + SO4-2 + 14H2O
 log_k 18
 delta_h 0 kcal
SOLUTION_MASTER_SPECIES
    Slurry        Slurry           0     Slurry          74
SOLUTION_SPECIES
 Slurry  = Slurry
 log_k 0
RATES
Slurry_dissolution
-start
10 k = 1/(5*60)  # sec^-1 (5 minute half life)
20 rate = k * TOT("Slurry") * (1 - SR("Portlandite"))
30 moles = rate * TIME
40 SAVE moles
-end
END

SOLUTION 1  Buffalo Gulch stormwater
 units mg/l
 pH 6.66
 pe 8.0
 temp 15.0
 K 8.6
 Na 6.5
 Ca 57.6
 Mg 13.2
 Fe(+3) 0.1
 Fe(+2) 24.
 Mn 2.7
 Al 0.1
 Zn 1.86
 S 11.9
 Cl 7.
 Si 100
 Cd 0.0046
 Cu 0.46
 Alkalinity CO3-2 78.5
 N 1.1
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
```

```
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
SOLUTION 2  MSD Stormwater
 units mg/l
 pH 6.66
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 7.4
 Na 4.7
 Ca 30.
 Mg 8.0
 Fe(+3) .1
 Fe(+2) 10.
 Mn 0.88
 Al 0.10
 Zn 1.0
 S 11.4
 Cl 10.3
 Si 61
 Cd 0.003
 Cu 0.37
 Alkalinity CO3-2 57.3
 N 1.3
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX 1
    1    0.5
    2    0.5
SAVE solution 3
END
SOLUTION 4  BTL Input Water
 units mg/l
 pH 7.70
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 8.7
 Na 54.1
 Ca 121
 Mg 31.9
 Fe(+3) .1
 Fe(+2) 5.2
 Mn 4.85
 Al 0.41
 Zn 5.75
 S 369.
 Cl 50
 Si 31.4
 Cd 0.0024
 Cu 0.88
```

```
 Alkalinity CO3-2 86.5
 N 0.9
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX
    3    0.15
    4    0.85
SAVE solution 5
END
TITLE Add Ca(OH)2
USE solution 5
REACTION 1
 Slurry 1
 0.042 moles
SAVE solution 6
END

TITLE kinetic reaction, equilibrium with surface, minerals, and gases
USE solution 6

INCREMENTAL_REACTIONS

KINETICS 1
Slurry_dissolution
    -formula  Slurry -1 Ca(OH)2  1
    -m        10
    -m0       10
    -tol      1e-008
-steps       10 in 5 steps # seconds
-step_divide 1
-runge_kutta 3
-bad_step_max 500

EQUILIBRIUM_PHASES
# Basaluminite 0 0
# Alunite 0 0
# Jurbanite 0 0
# Al(OH)3(a) 0 0
  Gibbsite    0     0
# Calcite 0 0
 Cu(OH)2 0 0
# Epsomite 0 0
 Fe(OH)3(a) 0 0
 Zn(OH)2-b 0 0
# Gypsum 0 0
 O2(g)  -0.7  10
# CO2(g) -3.45
 SiO2(a) 0       0

SURFACE 1
    -sites DENSITY
```

```
    Hfo_sOH Fe(OH)3(a)       equilibrium_phase 0.005   50000
    Hfo_wOH Fe(OH)3(a)       equilibrium_phase 0.2
SAVE solution 7
END

TITLE Equilibrate MetalCalcite
USE solution 7
EQUILIBRIUM_PHASES
# CO2(g) -6.5
 Gibbsite    0     0
 MetalCalcite 0 0
 SiO2(a) 0       0
SAVE solution 8
END

TITLE Titrate CO2
USE solution 8
REACTION 1
    CO2(g)     1
    .00039 moles in 3 steps
SAVE solution 9
END
```

```
TITLE Butte Treatment, Mix BGStormwater 7.5% BTL 92.5%
PHASES
MetalCalcite
 Ca.9490Mg.03815Cu.00792Zn.00493(CO3) = CO3-2 + .9490Ca+2 + .03815Mg+2 + .00792Cu+2 +
.00493Zn+2
 log_k           -8.480
 delta_h -2.297 kcal
Al(OH)3(a)
 Al(OH)3 + 3H+ = Al+3 + 3H2O
 log_k 10.38
 delta_h -27.045 kcal
Schwertmannite
 Fe8O8(OH)6SO4 + 22H+ = 8Fe+3 + SO4-2 + 14H2O
 log_k 18
 delta_h 0 kcal
SOLUTION_MASTER_SPECIES
    Slurry        Slurry           0      Slurry          74
SOLUTION_SPECIES
 Slurry  = Slurry
 log_k 0
RATES
Slurry_dissolution
-start
10 k = 1/(5*60)  # sec^-1 (5 minute half life)
20 rate = k * TOT("Slurry") * (1 - SR("Portlandite"))
30 moles = rate * TIME
40 SAVE moles
-end
END

SOLUTION 1  Buffalo Gulch stormwater
 units mg/l
 pH 6.66
 pe 8.0
 temp 15.0
 K 8.6
 Na 6.5
 Ca 57.6
 Mg 13.2
 Fe(+3) 0.1
 Fe(+2) 24.
 Mn 2.7
 Al 0.1
 Zn 1.86
 S 11.9
 Cl 7.
 Si 100
 Cd 0.0046
 Cu 0.46
 Alkalinity CO3-2 78.5
 N 1.1
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
```

```
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
SOLUTION 2  MSD Stormwater
 units mg/l
 pH 6.66
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 7.4
 Na 4.7
 Ca 30.
 Mg 8.0
 Fe(+3) .1
 Fe(+2) 10.
 Mn 0.88
 Al 0.10
 Zn 1.0
 S 11.4
 Cl 10.3
 Si 61
 Cd 0.003
 Cu 0.37
 Alkalinity CO3-2 57.3
 N 1.3
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX 1
    1    0.5
    2    0.5
SAVE solution 3
END
SOLUTION 4  BTL Input Water
 units mg/l
 pH 7.70
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 8.7
 Na 54.1
 Ca 121
 Mg 31.9
 Fe(+3) .1
 Fe(+2) 5.2
 Mn 4.85
 Al 0.41
 Zn 5.75
 S 369.
 Cl 50
 Si 31.4
 Cd 0.0024
 Cu 0.88
```

```
 Alkalinity CO3-2 86.5
 N 0.9
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX
    1    0.075
    4    0.925
SAVE solution 5
END
TITLE Add Ca(OH)2
USE solution 5
REACTION 1
 Slurry 1
 0.042 moles
SAVE solution 6
END

TITLE kinetic reaction, equilibrium with surface, minerals, and gases
USE solution 6

INCREMENTAL_REACTIONS

KINETICS 1
Slurry_dissolution
    -formula  Slurry -1 Ca(OH)2  1
    -m        10
    -m0       10
    -tol      1e-008
-steps       10 in 5 steps # seconds
-step_divide 1
-runge_kutta 3
-bad_step_max 500

EQUILIBRIUM_PHASES
# Basaluminite 0 0
# Alunite 0 0
# Jurbanite 0 0
# Al(OH)3(a) 0 0
  Gibbsite    0     0
# Calcite 0 0
 Cu(OH)2 0 0
# Epsomite 0 0
 Fe(OH)3(a) 0 0
 Zn(OH)2-b 0 0
# Gypsum 0 0
 O2(g)  -0.7  10
# CO2(g) -3.45
 SiO2(a) 0       0

SURFACE 1
    -sites DENSITY
```

```
    Hfo_sOH Fe(OH)3(a)       equilibrium_phase 0.005   50000
    Hfo_wOH Fe(OH)3(a)       equilibrium_phase 0.2
SAVE solution 7
END

TITLE Equilibrate MetalCalcite
USE solution 7
EQUILIBRIUM_PHASES
# CO2(g) -6.5
 Gibbsite    0      0
 MetalCalcite 0 0
 SiO2(a) 0        0
SAVE solution 8
END

TITLE Titrate CO2
USE solution 8
REACTION 1
    CO2(g)      1
    .00039 moles in 3 steps
SAVE solution 9
END
```

```
TITLE Butte Treatment, Mix BGStormwater 15% BTL 85%
PHASES
MetalCalcite
 Ca.9490Mg.03841Cu.00752Zn.00507(CO3) = CO3-2 + .9490Ca+2 + .03841Mg+2 + .00752Cu+2 +
.00507Zn+2
 log_k           -8.480
 delta_h -2.297 kcal
Al(OH)3(a)
 Al(OH)3 + 3H+ = Al+3 + 3H2O
 log_k 10.38
 delta_h -27.045 kcal
Schwertmannite
 Fe8O8(OH)6SO4 + 22H+ = 8Fe+3 + SO4-2 + 14H2O
 log_k 18
 delta_h 0 kcal
SOLUTION_MASTER_SPECIES
    Slurry        Slurry           0      Slurry          74
SOLUTION_SPECIES
 Slurry  = Slurry
 log_k 0
RATES
Slurry_dissolution
-start
10 k = 1/(5*60)  # sec^-1 (5 minute half life)
20 rate = k * TOT("Slurry") * (1 - SR("Portlandite"))
30 moles = rate * TIME
40 SAVE moles
-end
END

SOLUTION 1  Buffalo Gulch stormwater
 units mg/l
 pH 6.66
 pe 8.0
 temp 15.0
 K 8.6
 Na 6.5
 Ca 57.6
 Mg 13.2
 Fe(+3) 0.1
 Fe(+2) 24.
 Mn 2.7
 Al 0.1
 Zn 1.86
 S 11.9
 Cl 7.
 Si 100
 Cd 0.0046
 Cu 0.46
 Alkalinity CO3-2 78.5
 N 1.1
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
```

```
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
SOLUTION 2  MSD Stormwater
 units mg/l
 pH 6.66
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 7.4
 Na 4.7
 Ca 30.
 Mg 8.0
 Fe(+3) .1
 Fe(+2) 10.
 Mn 0.88
 Al 0.10
 Zn 1.0
 S 11.4
 Cl 10.3
 Si 61
 Cd 0.003
 Cu 0.37
 Alkalinity CO3-2 57.3
 N 1.3
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX 1
    1    0.5
    2    0.5
SAVE solution 3
END
SOLUTION 4  BTL Input Water
 units mg/l
 pH 7.70
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 8.7
 Na 54.1
 Ca 121
 Mg 31.9
 Fe(+3) .1
 Fe(+2) 5.2
 Mn 4.85
 Al 0.41
 Zn 5.75
 S 369.
 Cl 50
 Si 31.4
 Cd 0.0024
 Cu 0.88
```

```
 Alkalinity CO3-2 86.5
 N 0.9
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX
    1    0.15
    4    0.85
SAVE solution 5
END
TITLE Add Ca(OH)2
USE solution 5
REACTION 1
 Slurry 1
 0.042 moles
SAVE solution 6
END

TITLE kinetic reaction, equilibrium with surface, minerals, and gases
USE solution 6

INCREMENTAL_REACTIONS

KINETICS 1
Slurry_dissolution
    -formula  Slurry -1 Ca(OH)2  1
    -m        10
    -m0       10
    -tol      1e-008
-steps       10 in 5 steps # seconds
-step_divide 1
-runge_kutta 3
-bad_step_max 500

EQUILIBRIUM_PHASES
# Basaluminite 0 0
# Alunite 0 0
# Jurbanite 0 0
# Al(OH)3(a) 0 0
  Gibbsite    0     0
# Calcite 0 0
 Cu(OH)2 0 0
# Epsomite 0 0
 Fe(OH)3(a) 0 0
 Zn(OH)2-b 0 0
# Gypsum 0 0
 O2(g)  -0.7  10
# CO2(g) -3.45
 SiO2(a) 0       0

SURFACE 1
    -sites DENSITY
```

```
    Hfo_sOH Fe(OH)3(a)       equilibrium_phase 0.005   50000
    Hfo_wOH Fe(OH)3(a)       equilibrium_phase 0.2
SAVE solution 7
END

TITLE Equilibrate MetalCalcite
USE solution 7
EQUILIBRIUM_PHASES
# CO2(g) -6.5
 Gibbsite    0      0
 MetalCalcite 0 0
 SiO2(a) 0        0
SAVE solution 8
END

TITLE Titrate CO2
USE solution 8
REACTION 1
    CO2(g)      1
    .00039 moles in 3 steps
SAVE solution 9
END
```

```
TITLE Butte Treatment, Mix MSDStormwater 7.5% BTL 92.5%
PHASES
MetalCalcite
 Ca.9490Mg.03796Cu.00804Zn.0050(CO3) = CO3-2 + .9490Ca+2 + .03796Mg+2 + .00804Cu+2 +
.0050Zn+2
 log_k           -8.480
 delta_h -2.297 kcal
Al(OH)3(a)
 Al(OH)3 + 3H+ = Al+3 + 3H2O
 log_k 10.38
 delta_h -27.045 kcal
Schwertmannite
 Fe8O8(OH)6SO4 + 22H+ = 8Fe+3 + SO4-2 + 14H2O
 log_k 18
 delta_h 0 kcal
SOLUTION_MASTER_SPECIES
    Slurry        Slurry           0      Slurry          74
SOLUTION_SPECIES
 Slurry  = Slurry
 log_k 0
RATES
Slurry_dissolution
-start
10 k = 1/(5*60)  # sec^-1 (5 minute half life)
20 rate = k * TOT("Slurry") * (1 - SR("Portlandite"))
30 moles = rate * TIME
40 SAVE moles
-end
END

SOLUTION 1  Buffalo Gulch stormwater
 units mg/l
 pH 6.66
 pe 8.0
 temp 15.0
 K 8.6
 Na 6.5
 Ca 57.6
 Mg 13.2
 Fe(+3) 0.1
 Fe(+2) 24.
 Mn 2.7
 Al 0.1
 Zn 1.86
 S 11.9
 Cl 7.
 Si 100
 Cd 0.0046
 Cu 0.46
 Alkalinity CO3-2 78.5
 N 1.1
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
```

```
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
SOLUTION 2  MSD Stormwater
 units mg/l
 pH 6.66
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 7.4
 Na 4.7
 Ca 30.
 Mg 8.0
 Fe(+3) .1
 Fe(+2) 10.
 Mn 0.88
 Al 0.10
 Zn 1.0
 S 11.4
 Cl 10.3
 Si 61
 Cd 0.003
 Cu 0.37
 Alkalinity CO3-2 57.3
 N 1.3
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX 1
    1    0.5
    2    0.5
SAVE solution 3
END
SOLUTION 4  BTL Input Water
 units mg/l
 pH 7.70
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 8.7
 Na 54.1
 Ca 121
 Mg 31.9
 Fe(+3) .1
 Fe(+2) 5.2
 Mn 4.85
 Al 0.41
 Zn 5.75
 S 369.
 Cl 50
 Si 31.4
 Cd 0.0024
 Cu 0.88
```

```
 Alkalinity CO3-2 86.5
 N 0.9
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX
    2    0.075
    4    0.925
SAVE solution 5
END
TITLE Add Ca(OH)2
USE solution 5
REACTION 1
 Slurry 1
 0.042 moles
SAVE solution 6
END

TITLE kinetic reaction, equilibrium with surface, minerals, and gases
USE solution 6

INCREMENTAL_REACTIONS

KINETICS 1
Slurry_dissolution
    -formula  Slurry -1 Ca(OH)2  1
    -m        10
    -m0       10
    -tol      1e-008
-steps       10 in 5 steps # seconds
-step_divide 1
-runge_kutta 3
-bad_step_max 500

EQUILIBRIUM_PHASES
# Basaluminite 0 0
# Alunite 0 0
# Jurbanite 0 0
# Al(OH)3(a) 0 0
  Gibbsite    0     0
# Calcite 0 0
 Cu(OH)2 0 0
# Epsomite 0 0
 Fe(OH)3(a) 0 0
 Zn(OH)2-b 0 0
# Gypsum 0 0
 O2(g)  -0.7  10
# CO2(g) -3.45
 SiO2(a) 0       0

SURFACE 1
    -sites DENSITY
```

```
    Hfo_sOH Fe(OH)3(a)       equilibrium_phase 0.005   50000
    Hfo_wOH Fe(OH)3(a)       equilibrium_phase 0.2
SAVE solution 7
END

TITLE Equilibrate MetalCalcite
USE solution 7
EQUILIBRIUM_PHASES
# CO2(g) -6.5
 Gibbsite    0     0
 MetalCalcite 0 0
 SiO2(a) 0       0
SAVE solution 8
END

TITLE Titrate CO2
USE solution 8
REACTION 1
    CO2(g)     1
    .00039 moles in 3 steps
SAVE solution 9
END
```

```
TITLE Butte Treatment, Mix MSDStormwater 15% BTL 85%
PHASES
MetalCalcite
 Ca.9490Mg.03833Cu.00767Zn.0050(CO3) = CO3-2 + .9490Ca+2 + .03833Mg+2 + .00767Cu+2 +
.0050Zn+2
 log_k           -8.480
 delta_h -2.297 kcal
Al(OH)3(a)
 Al(OH)3 + 3H+ = Al+3 + 3H2O
 log_k 10.38
 delta_h -27.045 kcal
Schwertmannite
 Fe8O8(OH)6SO4 + 22H+ = 8Fe+3 + SO4-2 + 14H2O
 log_k 18
 delta_h 0 kcal
SOLUTION_MASTER_SPECIES
    Slurry        Slurry           0     Slurry          74
SOLUTION_SPECIES
 Slurry  = Slurry
 log_k 0
RATES
Slurry_dissolution
-start
10 k = 1/(5*60)  # sec^-1 (5 minute half life)
20 rate = k * TOT("Slurry") * (1 - SR("Portlandite"))
30 moles = rate * TIME
40 SAVE moles
-end
END

SOLUTION 1  Buffalo Gulch stormwater
 units mg/l
 pH 6.66
 pe 8.0
 temp 15.0
 K 8.6
 Na 6.5
 Ca 57.6
 Mg 13.2
 Fe(+3) 0.1
 Fe(+2) 24.
 Mn 2.7
 Al 0.1
 Zn 1.86
 S 11.9
 Cl 7.
 Si 100
 Cd 0.0046
 Cu 0.46
 Alkalinity CO3-2 78.5
 N 1.1
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
```

```
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
SOLUTION 2  MSD Stormwater
 units mg/l
 pH 6.66
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 7.4
 Na 4.7
 Ca 30.
 Mg 8.0
 Fe(+3) .1
 Fe(+2) 10.
 Mn 0.88
 Al 0.10
 Zn 1.0
 S 11.4
 Cl 10.3
 Si 61
 Cd 0.003
 Cu 0.37
 Alkalinity CO3-2 57.3
 N 1.3
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX 1
    1    0.5
    2    0.5
SAVE solution 3
END
SOLUTION 4  BTL Input Water
 units mg/l
 pH 7.70
 pe 8.0
#redox Fe(+2)/Fe(+3)
 temp 15.
 K 8.7
 Na 54.1
 Ca 121
 Mg 31.9
 Fe(+3) .1
 Fe(+2) 5.2
 Mn 4.85
 Al 0.41
 Zn 5.75
 S 369.
 Cl 50
 Si 31.4
 Cd 0.0024
 Cu 0.88
```

```
 Alkalinity CO3-2 86.5
 N 0.9
# O(0) 15    O2(g) -0.7
# C 2. CO2(g) -2.8
-water 1 # kg
SELECTED_OUTPUT
 -file roger.sel
 -reset FALSE
 -sim
 -soln
 -ph
 -pe
 -totals Fe Al Cu Cd Zn Ca K Mg Mn Na S(6)
 -equilibrium_phases Fe(OH)3(a) Gibbsite SiO2(a)
 -saturation_indices Portlandite Alunite Basaluminite Jurbanite   SiO2(a) Gibbsite Calcite
Gypsum Jarosite(ss) Fe(OH)3(a) Rhodochrosite
 -molalities Cu+2 Hfo_wOCu+ Hfo_sOCu+
 -molalities Cd+2 Hfo_wOCd+ Hfo_sOCd+
 -molalities Zn+2 Hfo_wOZn+ Hfo_sOZn+
 -molalities SO4-2 Hfo_wSO4- Hfo_wOHSO4-2
END
MIX
    2    0.15
    4    0.85
SAVE solution 5
END
TITLE Add Ca(OH)2
USE solution 5
REACTION 1
 Slurry 1
 0.042 moles
SAVE solution 6
END

TITLE kinetic reaction, equilibrium with surface, minerals, and gases
USE solution 6

INCREMENTAL_REACTIONS

KINETICS 1
Slurry_dissolution
    -formula  Slurry -1 Ca(OH)2  1
    -m        10
    -m0       10
    -tol      1e-008
-steps       10 in 5 steps # seconds
-step_divide 1
-runge_kutta 3
-bad_step_max 500

EQUILIBRIUM_PHASES
# Basaluminite 0 0
# Alunite 0 0
# Jurbanite 0 0
# Al(OH)3(a) 0 0
  Gibbsite    0     0
# Calcite 0 0
 Cu(OH)2 0 0
# Epsomite 0 0
 Fe(OH)3(a) 0 0
 Zn(OH)2-b 0 0
# Gypsum 0 0
 O2(g)  -0.7  10
# CO2(g) -3.45
 SiO2(a) 0       0

SURFACE 1
    -sites DENSITY
```

```
    Hfo_sOH Fe(OH)3(a)       equilibrium_phase 0.005   50000
    Hfo_wOH Fe(OH)3(a)       equilibrium_phase 0.2
SAVE solution 7
END

TITLE Equilibrate MetalCalcite
USE solution 7
EQUILIBRIUM_PHASES
# CO2(g) -6.5
 Gibbsite    0      0
 MetalCalcite 0 0
 SiO2(a) 0       0
SAVE solution 8
END

TITLE Titrate CO2
USE solution 8
REACTION 1
    CO2(g)      1
    .00039 moles in 3 steps
SAVE solution 9
END
```

APPENDIX C-2

BENCH-SCALE LABORATORY ANALYTICAL SUMMARY

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

2013 BTL Storm Water Treatment Analytical Summary

Project Phase	Storm Event	Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Aluminum Result (mg/L)	Aluminum Data Qualifier	Arsenic Dis Result (mg/L)	Arsenic Dis Data Qualifier	Arsenic TR Result (mg/L)	Arsenic TR Data Qualifier	Cadmium Dis Result (mg/L)	Cadmium Dis Data Qualifier	Cadmium TR Result (mg/L)	Cadmium TR Data Qualifier	Calcium Result (mg/L)	Calcium Data Qualifier	Copper Dis Result (mg/L)	Copper Dis Data Qualifier	Copper TR Result (mg/L)	Copper TR Data Qualifier	Iron Result (mg/L)	Iron Data Qualifier	Lead Dis Result (mg/L)	Lead Dis Data Qualifier	Lead TR Result (mg/L)	Lead TR Data Qualifier
Bench-Scale Evaluation	Storm Event No. 1	Bottle #1 - 15 % Composite Dilution	8/6/2013	LAO-BS-01-081213	10238388007	10238388	0.0073		NA		0.0027		NA		0.0015		100		NA		0.017		0.014	J	NA		0.00056	
		Bottle #2 - 15 % Composite Dilution	8/6/2013	LAO-BS-02-081213	10238388008	10238388	0.0079		NA		0.0024		NA		0.0018		98.9		NA		0.015		0.032	J	NA		0.00039	
		Bottle #3 - 15 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-03-081213	10238388009	10238388	0.0064		NA		0.0024		NA		0.0016		97.9		NA		0.018		0.016	J	NA		0.00034	
		Bottle #4 - 15 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-04-081213	10238388010	10238388	0.0045		NA		0.0022		NA		0.0018		97.4		NA		0.013		0.011	J	NA		0.00017	
		Bottle #5 - 15 % MSD Dilution	8/6/2013	LAO-BS-05-081213	10238388011	10238388	0.0052		NA		0.0027		NA		0.0011		96.7	M1	NA		0.012		0.012	J	NA		0.00017	
		Bottle #6 - 15 % MSD Dilution	8/6/2013	LAO-BS-06-081213	10238388012	10238388	0.027		NA		0.0026		NA		0.0014		98.6		NA		0.013		0.045	J	NA		0.00065	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-07-081213	10238388013	10238388	0.0078		NA		0.0023		NA		0.0013		104		NA		0.011		0.017	J	NA		0.00032	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-08-081213	10238388014	10238388	0.0038	J	NA		0.002		NA		0.0015		104		NA		0.011		0.011	J	NA		0.00014	
		Bottle #9 - 7.5 % MSD Dilution	8/6/2013	LAO-BS-09-081213	10238388015	10238388	0.023		NA		0.0024		NA		0.0019		103		NA		0.018		0.07		NA		0.001	
		Bottle #10 - 7.5 % MSD Dilution	8/6/2013	LAO-BS-10-081213	10238388016	10238388	0.0054		NA		0.0022		NA		0.00091		94.1		NA		0.0096		0.016	J	NA		0.00015	
		Bottle #11 - BTL Influent control	8/6/2013	LAO-BS-11-081213	10238388017	10238388	0.0041		NA		0.0017		NA		0.0014		107		NA		0.01		0.024	J	NA		0.00013	
		Bottle #12 - BTL Influent control	8/6/2013	LAO-BS-12-081213	10238388018	10238388	0.0033	J	NA		0.0015		NA		0.0015		105		NA		0.0092		0.019	J	NA		0.000077	J
		Bottle #13 - DI Blank	8/6/2013	LAO-BS-13-081213	10238388019	10238388	0.029		NA		0.00013	J	NA		<0.00008		38		NA		0.00076		<0.050		NA		0.000075	J
		Bottle #14 - DI Blank	8/6/2013	LAO-BS-14-081213	10238388020	10238388	0.028		NA		0.0002	J	NA		<0.00008		34.1		NA		0.00084		<0.050		NA		0.00009	J
Bench-Scale Evaluation	Storm Event No. 2	Bottle #1 - 15 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-1-090313	10240736001	10240736	0.0057		NA		0.0026		NA		0.0019		98.5	M1	NA		0.022		0.021	J	NA		0.00038	
		Bottle #2 - 15 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-2-090313	10240736002	10240736	0.019		NA		0.0028		NA		0.0023		98.8		NA		0.026		0.048	J	NA		0.00099	
		Bottle #3 - 7.5 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-3-090313	10240736003	10240736	0.003	J	NA		0.0021		NA		0.0018		102		NA		0.017		0.022	J	NA		0.00024	
		Bottle #4 - 7.5 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-4-090313	10240736004	10240736	0.025		NA		0.0022		NA		0.0016		105		NA		0.016		0.021	J	NA		0.00024	
		Bottle #5 - BTL Influent control	8/27/2013	LAO-BS-5-090313	10240736005	10240736	<0.004		NA		0.0018		NA		0.0015		106		NA		0.014		0.024	J	NA		0.000061	J
		Bottle #6 - BTL Influent control	8/27/2013	LAO-BS-6-090313	10240736006	10240736	0.0027	J	NA		0.002		NA		0.0012		106		NA		0.012		0.019	J	NA		0.000056	J
		Bottle #7 - DI Blank	8/27/2013	LAO-BS-7-090313	10240736007	10240736	0.015		NA		0.00012	J	NA		<0.00008		23.7		NA		0.00068		0.0066	J	NA		0.0004	
		Bottle #8 - DI Blank	8/27/2013	LAO-BS-8-090313	10240736008	10240736	0.018		NA		0.00014	J	NA		<0.00008		24.2		NA		0.00059		<0.05		NA		<0.0001	
Bench-Scale Evaluation	Storm Event No. 3	Bottle #9 - 15 % Composite Dilution	8/29/2013	LAO-BS-9-090313	10240736009	10240736	0.0061		NA		0.002		NA		0.0015		99		NA		0.015		0.022	J	NA		0.00025	
		Bottle #10 - 15 % Composite Dilution	8/29/2013	LAO-BS-10-090313	10240736010	10240736	0.0035	J	NA		0.0019		NA		0.0016		98.6		NA		0.015		0.021	J	NA		0.00018	
		Bottle #11 - 15 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-11-090313	10240736011	10240736	0.013		NA		0.0023		NA		0.0016		102	M1	NA		0.016		0.036	J	NA		0.00054	
		Bottle #12 - 15 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-12-090313	10240736012	10240736	0.012		NA		0.0022		NA		0.0015		99.5		NA		0.015		0.035	J	NA		0.00043	
		Bottle #13 - 15 % MSD Dilution	8/29/2013	LAO-BS-13-090313	10240736013	10240736	0.0028	J	NA		0.0019		NA		0.0017		98.6		NA		0.017		0.023	J	NA		0.00013	
		Bottle #14 - 15 % MSD Dilution	8/29/2013	LAO-BS-14-090313	10240736014	10240736	0.0032	J	NA		0.002		NA		0.0017		98.8		NA		0.017		0.027	J	NA		0.00015	
		Bottle #15 - 7.5 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-15-090313	10240736015	10240736	0.0032	J	NA		0.0019		NA		0.0015		103		NA		0.012		0.018	J	NA		0.00013	
		Bottle #16 - 7.5 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-16-090313	10240736016	10240736	0.0017	J	NA		0.0017		NA		0.0012		103		NA		0.0096		0.016	J	NA		0.0001	
		Bottle #17 - 7.5 % MSD Dilution	8/29/2013	LAO-BS-17-090313	10240736017	10240736	0.0024	J	NA		0.002		NA		0.0013		106		NA		0.014		0.028	J	NA		0.000078	J
		Bottle #18 - 7.5 % MSD Dilution	8/29/2013	LAO-BS-18-090313	10240736018	10240736	0.002	J	NA		0.0019		NA		0.0016		104		NA		0.016		0.03	J	NA		0.000085	J
		Bottle #19 - BTL Influent control	8/29/2013	LAO-BS-19-090313	10240736019	10240736	0.0031	J	NA		0.0016		NA		0.0015		107		NA		0.011		0.032	J	NA		0.000067	J
		Bottle #20 - BTL Influent control	8/29/2013	LAO-BS-20-090313	10240736020	10240736	0.0018	J	NA		0.0016		NA		0.0016		111		NA		0.012		0.031	J	NA		0.000059	J
		Bottle #21 - DI Blank	8/29/2013	LAO-BS-21-090313	10240736021	10240736	0.029		NA		<0.0005		NA		0.000042	J	35.2		NA		0.0021		0.0061	J	NA		0.0021	
		Bottle #22 - DI Blank	8/29/2013	LAO-BS-22-090313	10240736022	10240736	0.029		NA		<0.0005		NA		0.000041	J	35.8		NA		0.0011		0.0063	J	NA		0.00016	
Bench-Scale Evaluation	Storm Event No. 4	Bottle #1 - 15 % Composite Dilution	9/23/2013	LAO-BS-01-092313	10243168001	10243168	0.0073		NA		0.0025		NA		0.0006		102	M1	NA		0.011		0.026	J	NA		0.00017	
		Bottle #2 - 15 % Composite Dilution	9/23/2013	LAO-BS-02-092313	10243168002	10243168	0.0056		NA		0.0024		NA		0.00048		101		NA		0.0094		0.02	J	NA		0.00011	
		Bottle #3 - 15 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-03-092313	10243168003	10243168	0.08		NA		0.0024		NA		0.00043		97.4		NA		0.01		0.019	J	NA		0.00043	
		Bottle #4 - 15 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-04-092313	10243168004	10243168	0.28		NA		0.0022		NA		0.00064		98.8		NA		0.0096		0.042	J	NA		0.00015	
		Bottle #5 - 15 % MSD Dilution	9/23/2013	LAO-BS-05-092313	10243168005	10243168	0.012		NA		0.0025		NA		0.00048		100		NA		0.012		0.027	J	NA		0.00057	
		Bottle #6 - 15 % MSD Dilution	9/23/2013	LAO-BS-06-092313	10243168006	10243168	0.0056		NA		0.0021		NA		0.00065		100		NA		0.011		0.022	J	NA		0.00017	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-07-092313	10243168007	10243168	0.0047		NA		0.0021		NA		0.00064		108		NA		0.0091		0.023	J	NA		0.00011	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-08-092313	10243168009	10243168	0.0047		NA		0.0024		NA		0.00053		106		NA		0.0092		0.02	J	NA		0.00012	
		Bottle #9 - 7.5 % MSD Dilution	9/23/2013	LAO-BS-09-092313	10243168008	10243168	0.0046		NA		0.0022		NA		0.00061		106		NA		0.0091		0.021	J	NA		0.000097	J
		Bottle #10 - 7.5 % MSD Dilution	9/23/2013	LAO-BS-10-092313	10243168010	10243168	0.0041		NA		0.0022		NA		0.00063		108		NA		0.0099		0.02	J	NA		0.000075	J
		Bottle #11 - BTL Influent control	9/23/2013	LAO-BS-11-092313	10243168011	10243168	0.0051		NA		0.0022		NA		0.00052		110	M1	NA		0.0092		0.021	J	NA		<0.00010	
		Bottle #12 - BTL Influent control	9/23/2013	LAO-BS-12-092313	10243168012	10243168	0.0037	J	NA		0.0021		NA		0.00058		110		NA		0.0098		0.022	J	NA		0.000068	J
		Bottle #13 - DI Blank	9/23/2013	LAO-BS-13-092313	10243168013	10243168	0.015		NA		0.00014	J	NA		0.000034	J	38.5		NA		0.0017		0.0061	J	NA		0.00007	J
		Bottle #14 - DI Blank	9/23/2013	LAO-BS-14-092313	10243168014	10243168	0.018		NA		0.00022	J	NA		0.00009		40.8		NA		0.0028		0.028	J	NA		0.00013	
Bench-Scale Evaluation	Storm Event No. 5	Bottle #1 - 15 % Composite Dilution	9/26/2013	LAO-BS-01-092613	10244062001	10244062	0.0054	B	NA		0.0019		NA		0.00084		91		NA		0.014		0.03	J	NA		0.00014	
		Bottle #2 - 15 % Composite Dilution	9/26/2013	LAO-BS-02-092613	10244062002	10244062	0.021		NA		0.0018		NA		0.001		89.3		NA		0.014		0.037	J	NA		0.00022	
		Bottle #3 - 15 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-03-092613	10244062003	10244062	0.0088	B	NA		0.0019		NA		0.0009		88.6		NA		0.013		0.031	J	NA		0.00028	
		Bottle #4 - 15 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-04-092613	10244062004	10244062	0.0078	B	NA		0.0019		NA		0.0011		91.4		NA		0.014		0.033	J	NA		0.00026	
		Bottle #5 - 15 % MSD Dilution	9/26/2013	LAO-BS-05-092613	10244062005	10244062	0.0046	B	NA		0.0019		NA		0.0009		89.6		NA		0.013		0.03	J	NA		0.00011	
		Bottle #6 - 15 % MSD Dilution	9/26/2013	LAO-BS-06-092613	10244062006	10244062	0.0054	B	NA		0.0017		NA		0.001		90.2		NA		0.015		0.038	J	NA		0.00014	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-07-092613	10244062007	10244062	0.0068	B	NA		0.0017		NA		0.00088		96.4		NA		0.012		0.029	J	NA		0.00021	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-08-092613	10244062008	10244062	0.0088	B	NA		0.0018		NA		0.00096		94.7		NA		0.013		0.037	J	NA		0.00026	
		Bottle #9 - 7.5 % MSD Dilution	9/26/2013	LAO-BS-09-092613	10244062009	10244062	0.004	B	NA		0.0016		NA		0.00091		93	M1	NA		0.014		0.035	J	NA		0.000097	J
		Bottle #10 - 7.5 % MSD Dilution	9/26/2013	LAO-BS-10-092613	10244062010	10244062	0.0081	B	NA		0.0016		NA		0.001		97.6		NA		0.015		0.041	J	NA		0.00013	
		Bottle #11 - BTL Influent control	9/26/2013	LAO-BS-11-092613	10244062011	10244062	0.0035	J, B	NA		0.0016		NA		0.0012		102		NA		0.014		0.036	J	NA		0.000089	J
		Bottle #12 - BTL Influent control	9/26/2013	LAO-BS-12-092613	10244062012	10244062	0.0031	J, B	NA		0.0016		NA		0.0012		97		NA		0.014		0.038	J	NA		0.00009	J
		Bottle #13 - DI Blank	9/26/2013	LAO-BS-13-092613	10244062013	10244062	0.014	B	NA		<0.0005		NA		<0.00008		30.5		NA		0.0011		<0.05		NA		0.000057	J
		Bottle #14 - DI Blank	9/26/2013	LAO-BS-14-092613	10244062014	10244062	0.014	B	NA		<0.0005		NA		<0.00008		35.2		NA		0.0014		<0.050		NA		0.000075	J
BTL Routine Sample Event	Storm Event No. 1	BTL Location: SS-1	8/1/2013	LAO-SS-1-080113	10237712001	10237712	0.041		NA		0.021		NA		0.0002		124	M1	NA		0.016		0.067		NA		0.0018	
		BTL Location: SS-1	8/8/2013	LAO-SS-1-080813	10238388001	10244313	0.027		NA		0.014		NA		0.00013		116	M1	NA		0.012		0.045	J	NA		0.0017	
		BTL Location: SS-1	8/12/2013	LAO-SS-1-081213	10238388002	10244313	0.013		NA		0.0064		NA		0.000095		120		NA		0.0088		0.026	J	NA		0.0011	
		BTL Location: SS-1T	8/12/2013	LAO-SS-1T-081213	10238388003	10244313	0.013		NA		0.0063		NA		0.0001		120		NA		0.009		0.026	J	NA		0.0011	
		BTL Location: SS-2	8/5/2013	LAO-SS-2-080513	10237712002	10237712	0.083		NA		0.043		NA		0.02		124		NA		0.43		2.4		NA		0.0022	
		BTL Location: SS-2	8/12/2013	LAO-SS-2-081213	10238388004	10244313	0.059		NA		0.04		NA		0.022		120		NA		0.46		2.3		NA		0.0015	
		BTL Location: SS-3	8/12/2013	LAO-SS-3-081213	10238388005	10244313	0.32		NA		0.0039		NA		0.032		125		NA		1.6		10.3		NA		0.0013	
		BTL Location: SS-4	8/12/2013	LAO-SS-4-081213	10238388006	10244313	0.0028	J	NA		<0.0005		NA		<0.00008		0.096	B	NA		0.0025		0.0065	J	NA		0.000081	J
BTL Routine Sample Event	Storm Event No. 2	BTL Location: SS-1	8/22/2013	LAO-SS-1-082213	10239934001	10239934	0.036		NA		0.0077		NA		0.00037		143		NA		0.013		0.066		NA		0.0013	
		BTL Location: SS-1	8/26/2013	LAO-SS-1-082613	10239934002	10239934	0.063		NA		0.01		NA		0.00029		132		NA		0.026		0.12		NA		0.0024	
		BTL Location: SS-2	8/26/2013	LAO-SS-2-082613	10239934003	10239934	0.12		NA		0.053		NA		0.022		134		NA		0.65		3.8		NA		0.0029	

2013 BTL Storm Water Treatment Analytical Summary

Project Phase	Storm Event	Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Aluminum Result (mg/L)	Aluminum Data Qualifier	Arsenic Dis Result (mg/L)	Arsenic Dis Data Qualifier	Arsenic TR Result (mg/L)	Arsenic TR Data Qualifier	Cadmium Dis Result (mg/L)	Cadmium Dis Data Qualifier	Cadmium TR Result (mg/L)	Cadmium TR Data Qualifier	Calcium Result (mg/L)	Calcium Data Qualifier	Copper Dis Result (mg/L)	Copper Dis Data Qualifier	Copper TR Result (mg/L)	Copper TR Data Qualifier	Iron Result (mg/L)	Iron Data Qualifier	Lead Dis Result (mg/L)	Lead Dis Data Qualifier	Lead TR Result (mg/L)	Lead TR Data Qualifier
BTL Routine Sample Event	Storm Event No. 3	BTL Location: SS-1	8/29/2013	LAO-SS-1-082913	10240734001	10240734	0.065		NA		0.0089		NA		0.00028		131		NA		0.018		0.11		NA		0.0015	
		BTL Location: SS-1	9/2/2013	LAO-SS-1-090213	10240734002	10240734	0.033		NA		0.0082		NA		0.0002		132		NA		0.015		0.063		NA		0.0011	
		BTL Location: SS-1	9/12/2013	LAO-SS-1-091213	10242261001	10242261	0.011		NA		0.0067		NA		0.00026		116	M1	NA		0.012		0.038	J	NA		0.00064	
		BTL Location: SS-2	9/2/2013	LAO-SS-2-090213	10240734003	10240734	0.096		NA		0.033		NA		0.023		140	M1	NA		0.5	M1	2.7		NA		0.002	
BTL Routine Sample Event	Storm Event No. 4	BTL Location: SS-1	9/16/2013	LAO-SS-1-091613	10242261002	10242261	0.021		NA		0.0072		NA		0.00024		103		NA		0.013		0.046	J	NA		0.00088	
		BTL Location: SS-2	9/16/2013	LAO-SS-2-091613	10242261003	10242261	0.21		NA		0.05		NA		0.02		121		NA		0.66		3.5		NA		0.007	
BTL Routine Sample Event	Storm Event No. 5	BTL Location: SS-1	9/19/2013	LAO-SS-1-091913	10243169001	10243169	0.11		NA		0.016		NA		0.0003		110		NA		0.035		0.22		NA		0.0042	
		BTL Location: SS-1	9/23/2013	LAO-SS-1-092313	10243169002	10243169	0.17		NA		0.011		NA		0.00044		114		NA		0.032		0.26		NA		0.0041	
		BTL Location: SS-2	9/23/2013	LAO-SS-2-092313	10243169003	10243169	0.77		NA		0.11		NA		0.025		122		NA		1.3		8.1		NA		0.019	
		BTL Location: SS-3	9/23/2013	LAO-SS-3-092313	10243169004	10243169	0.3		NA		0.0036		NA		0.032		129		NA		1.6		9.6		NA		0.0013	
		BTL Location: SS-4	9/23/2013	LAO-SS-4-092313	10243169005	10243169	0.004	J	NA		0.00014	J	NA		<0.00008		0.034		NA		0.0018		0.006	J	NA		0.00016	
		BTL Location: SS-2T	9/23/2013	LAO-SS-2T-092313	10243169006	10243169	0.4		NA		0.069		NA		0.024		122		NA		0.96		5.4		NA		0.0099	
Buffalo Gulch Storm Water	Trec Storm Water ISCO Samples	Butte Hill Surface Water Monitoring: BG-CLV-1	8/1/2013	SD0578-080113	10237680036	10237680	NA		0.0053		0.052		0.00014		0.0059		79.4		0.017		0.56		33.5		0.0011		0.62	
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/22/2013	SD0634-082213	10239936012	10239936	NA		0.0071		0.045		0.00025		0.0043		65.6		0.037		0.55		26		0.012		0.56	
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/26/2013	SD0654-082613	10240339042	10240339	NA		0.0053		0.044		0.00027		0.0042		46.2		0.035		0.45		26.9		0.0029		0.47	
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/28/2013	SD0695-082813	10240702013	10240702	NA		0.0057		0.019		0.00022		0.0015		16		0.03		0.16		8.3		0.0025		0.16	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/3/2013	SD0723-090313	10241031012	10241031	NA		0.0077		0.01		0.0004		0.00083		31		0.038		0.07		1.54		0.0084		0.037	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/7/2013	SD0746-090713	10241536019	10241536	NA		0.0049		0.024		0.00018		0.0019		26.1		0.03		0.22		12.5		0.00086		0.21	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/13/2013	SD0777-091313	10242377019	10242377	NA		0.0049		0.063		0.00017		0.0071		68.7		0.024		0.7		28.9		0.0023		0.85	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/17/2013	SD0849-091713	10243059018	10243059	NA		0.0053		0.017		0.00021		0.0012		35.5		0.021		0.13		6.5		0.0013		0.11	
MSD Storm Water	Trec Storm Water ISCO Samples	Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/1/2013	SD0550-080113	10237680008	10237680	NA		0.0083		0.048		0.00023		0.0066		52.9		0.032		0.74		18.9		0.0024		0.62	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/1/2013	SD0551-080113	10237680009	10237680	NA		0.0082		0.044		0.00024		0.007		54.2		0.032		0.74		15.7		0.0031		0.62	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/26/2013	SD0659-082613	10240339012	10240339	NA		<0.00050		0.014		<0.00008		0.00088		21.5		0.0002	J	0.15		2.3		0.00024		0.054	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/7/2013	SD0742-090713	10241536015	10241536	NA		0.0095		0.012		0.00031		0.00053		17.5	ES	0.058		0.095		1.82		0.0019		0.035	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/13/2013	SD0789-091313	10242377031	10242377	NA		0.007		0.045		0.00017		0.0043		33.3		0.036		0.56		18.7		0.0019		0.45	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/13/2013	SD0790-091313	10242377032	10242377	NA		0.0069		0.048		0.00019		0.0043		34		0.036		0.58		19.5		0.002		0.5	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/17/2013	SD0865-091713	10243059034	10243059	NA		0.0071		0.0068		0.00018		0.00016		12.5		0.036		0.039		0.083		0.0017		0.0016	

Key:
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
U - Indicates the compound was analyzed for, but not detected.
D8 - The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
B - Analyte was detected in the associated method blank.
ES - The reported result is estimated because one or more of the constituent results qualified as such.
H1 - Analysis conducted outside the recognized method holding time.
H3 - Sample was received or analysis requested beyond the recognized method holding time.
H6 - Analysis initiated outside of the 15 minute EPA recommended holding time.
M1 - Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

2013 BTL Storm Water Treatment Analytical Summary

Project Phase	Storm Event	Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Magnesium Result (mg/L)	Magnesium Data Qualifier	Manganese Result (mg/L)	Manganese Data Qualifier	Mercury Dis Result (mg/L)	Mercury Dis Data Qualifier	Mercury TR Result (mg/L)	Mercury TR Data Qualifier	Potassium Result (mg/L)	Potassium Data Qualifier	Silica Result (mg/L)	Silica Data Qualifier	Silver Result (mg/L)	Silver Data Qualifier	Sodium Result (mg/L)	Sodium Data Qualifier	Uranium-238 Result (mg/L)	Uranium-238 Data Qualifier
Bench-Scale Evaluation	Storm Event No. 1	Bottle #1 - 15 % Composite Dilution	8/6/2013	LAO-BS-01-081213	10238388007	10238388	28		0.43		NA		<0.0002		8		19.1		0.0001	J, B	47		0.0049	
		Bottle #2 - 15 % Composite Dilution	8/6/2013	LAO-BS-02-081213	10238388008	10238388	27.2		0.53		NA		<0.0002		7.9		18.6		0.000053	J, B	46		0.0051	
		Bottle #3 - 15 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-03-081213	10238388009	10238388	27.3		0.59		NA		<0.0002		7.7		18.4		<0.0005		46.1		0.0049	
		Bottle #4 - 15 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-04-081213	10238388010	10238388	26.8		0.56		NA		<0.0002		7.7		18.6		<0.0005		46.1		0.0042	
		Bottle #5 - 15 % MSD Dilution	8/6/2013	LAO-BS-05-081213	10238388011	10238388	26.6		0.35		NA		<0.0002		7.8		17.4		<0.0005	M1	46.6	M1	0.0042	
		Bottle #6 - 15 % MSD Dilution	8/6/2013	LAO-BS-06-081213	10238388012	10238388	27		0.41		NA		<0.0002		7.9		18		<0.0005		46.7		0.0043	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-07-081213	10238388013	10238388	28.5		0.49		NA		<0.0002		8.1		19		<0.0005		49.5		0.0044	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-08-081213	10238388014	10238388	28.6		0.49		NA		<0.0002		8.2		19.6		<0.0005		50.8		0.0038	
		Bottle #9 - 7.5 % MSD Dilution	8/6/2013	LAO-BS-09-081213	10238388015	10238388	28.8		0.63		NA		<0.0002		8.2		18.7		<0.0005		49.5		0.0041	
		Bottle #10 - 7.5 % MSD Dilution	8/6/2013	LAO-BS-10-081213	10238388016	10238388	26.2		0.36		NA		<0.0002		8.2		16.6		0.0001	J, B	45.6		0.003	
		Bottle #11 - BTL Influent control	8/6/2013	LAO-BS-11-081213	10238388017	10238388	30.9		0.58		NA		<0.0002		8.5		18.8		<0.0005		52.8		0.0028	
		Bottle #12 - BTL Influent control	8/6/2013	LAO-BS-12-081213	10238388018	10238388	30.3		0.64		NA		<0.0002		8.3		19.3		<0.0005		52.3		0.0027	
		Bottle #13 - DI Blank	8/6/2013	LAO-BS-13-081213	10238388019	10238388	0.27		0.003		NA		<0.0002		0.94		5.3		<0.0005		6.1		<0.0005	
		Bottle #14 - DI Blank	8/6/2013	LAO-BS-14-081213	10238388020	10238388	0.32		0.0062		NA		<0.0002		0.95		5.7		<0.0005		6.3		<0.0005	
Bench-Scale Evaluation	Storm Event No. 2	Bottle #1 - 15 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-1-090313	10240736001	10240736	25	M1	0.69		NA		<0.0002		8.1		19.7		<0.0005	M1	45.1	M1	0.0036	
		Bottle #2 - 15 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-2-090313	10240736002	10240736	25.5		0.74		NA		0.00033		8.1		19.5		0.00032	J, B	45.1		0.0039	
		Bottle #3 - 7.5 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-3-090313	10240736003	10240736	26.6		0.69		NA		<0.0002		8.4		19.3		<0.0005		47.9		0.0027	
		Bottle #4 - 7.5 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-4-090313	10240736004	10240736	27.1		0.66		NA		<0.0002		8.5		19.8		0.000053	J, B	49		0.0024	
		Bottle #5 - BTL Influent control	8/27/2013	LAO-BS-5-090313	10240736005	10240736	28		0.62		NA		<0.0002		8.6		19.5		<0.0005		51		0.0018	
		Bottle #6 - BTL Influent control	8/27/2013	LAO-BS-6-090313	10240736006	10240736	27.5		0.57		NA		<0.0002		8.6		19		<0.0005		50.4		0.0017	
		Bottle #7 - DI Blank	8/27/2013	LAO-BS-7-090313	10240736007	10240736	0.78		0.0031		NA		0.000073	J	0.98		5.2		<0.0005		5.7		<0.0005	
		Bottle #8 - DI Blank	8/27/2013	LAO-BS-8-090313	10240736008	10240736	0.4		0.002		NA		<0.0002		0.96		5.5		<0.0005		5.6		<0.0005	
Bench-Scale Evaluation	Storm Event No. 3	Bottle #9 - 15 % Composite Dilution	8/29/2013	LAO-BS-9-090313	10240736009	10240736	25.8		0.41		NA		<0.0002		8.3		19.6		0.000073	J, B	47.4		0.0025	
		Bottle #10 - 15 % Composite Dilution	8/29/2013	LAO-BS-10-090313	10240736010	10240736	25.2		0.46		NA		<0.0002		8.2		19.4		<0.0005		46.9		0.0024	
		Bottle #11 - 15 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-11-090313	10240736011	10240736	26.1		0.37		NA		<0.0002		8.2		20.2		<0.0005	M1	47.7	M1	0.003	
		Bottle #12 - 15 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-12-090313	10240736012	10240736	25.5		0.36		NA		<0.0002		8.2		19.8		<0.0005		46.8		0.0027	
		Bottle #13 - 15 % MSD Dilution	8/29/2013	LAO-BS-13-090313	10240736013	10240736	25.8		0.5		NA		<0.0002		8.7		19.5		0.000064	J, B	47		0.0024	
		Bottle #14 - 15 % MSD Dilution	8/29/2013	LAO-BS-14-090313	10240736014	10240736	25.9		0.54		NA		<0.0002		8.5		19.9		<0.0005		46.8		0.0024	
		Bottle #15 - 7.5 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-15-090313	10240736015	10240736	27.1		0.51		NA		<0.0002		8.5		20.1		<0.0005		49.8		0.0025	
		Bottle #16 - 7.5 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-16-090313	10240736016	10240736	27.1		0.47		NA		<0.0002		8.4		20.1		<0.0005		49.8		0.0019	
		Bottle #17 - 7.5 % MSD Dilution	8/29/2013	LAO-BS-17-090313	10240736017	10240736	27.4		0.59		NA		<0.0002		8.8		20.5		<0.0005		50.4		0.0022	
		Bottle #18 - 7.5 % MSD Dilution	8/29/2013	LAO-BS-18-090313	10240736018	10240736	27.5		0.66		NA		<0.0002		8.7		20.5		0.000068	J, B	49.8		0.0027	
		Bottle #19 - BTL Influent control	8/29/2013	LAO-BS-19-090313	10240736019	10240736	28.5		0.68		NA		<0.0002		8.6		21		<0.0005		51.7		0.0025	
		Bottle #20 - BTL Influent control	8/29/2013	LAO-BS-20-090313	10240736020	10240736	30		0.71		NA		<0.0002		9		21.7		<0.0005		53.8		0.0026	
		Bottle #21 - DI Blank	8/29/2013	LAO-BS-21-090313	10240736021	10240736	0.35		0.0056		NA		<0.0002		0.97		4.7		<0.0005		6.2		<0.0005	
		Bottle #22 - DI Blank	8/29/2013	LAO-BS-22-090313	10240736022	10240736	0.36		0.0059		NA		<0.0002		0.98		5.1		<0.0005		6.6		<0.0005	
Bench-Scale Evaluation	Storm Event No. 4	Bottle #1 - 15 % Composite Dilution	9/23/2013	LAO-BS-01-092313	10243168001	10243168	25.2	M1	0.15		NA		<0.0002		8.2		19.1		<0.0005	M1	47.2	M1	0.0017	
		Bottle #2 - 15 % Composite Dilution	9/23/2013	LAO-BS-02-092313	10243168002	10243168	24.9		0.15		NA		<0.0002	M1	8.3		18.9		<0.0005		47.2		0.00099	
		Bottle #3 - 15 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-03-092313	10243168003	10243168	23.7		0.14		NA		<0.0002		8		18.2		<0.0005		45.7		0.00086	
		Bottle #4 - 15 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-04-092313	10243168004	10243168	24.3		0.17		NA		<0.0002		8		18.3		<0.0005		46.5		0.001	
		Bottle #5 - 15 % MSD Dilution	9/23/2013	LAO-BS-05-092313	10243168005	10243168	24.9		0.14		NA		<0.0002		8.3		18		<0.0005		47.6		0.00078	
		Bottle #6 - 15 % MSD Dilution	9/23/2013	LAO-BS-06-092313	10243168006	10243168	25.4		0.18		NA		<0.0002		8.4		18.4		<0.0005		47.2		0.001	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-07-092313	10243168007	10243168	26.9		0.28		NA		<0.0002		8.7		20		<0.0005		52.2		0.0013	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-08-092313	10243168009	10243168	26.1		0.2		NA		<0.0002		8.6		19.2		<0.0005		54.4		0.00094	
		Bottle #9 - 7.5 % MSD Dilution	9/23/2013	LAO-BS-09-092313	10243168008	10243168	26.6		0.26		NA		<0.0002		8.5		19.4		0.000084	J	53.2		0.0012	
		Bottle #10 - 7.5 % MSD Dilution	9/23/2013	LAO-BS-10-092313	10243168010	10243168	27.1		0.24		NA		<0.0002		8.7		19.7		<0.0005		54		0.0011	
		Bottle #11 - BTL Influent control	9/23/2013	LAO-BS-11-092313	10243168011	10243168	29	M1	0.27		NA		<0.0002		8.9		20.8		<0.0005	M1	58.5	M1	0.0011	
		Bottle #12 - BTL Influent control	9/23/2013	LAO-BS-12-092313	10243168012	10243168	28.9		0.34		NA		<0.0002		8.9		21.1		<0.0005		59.2		0.0012	
		Bottle #13 - DI Blank	9/23/2013	LAO-BS-13-092313	10243168013	10243168	0.47		0.0063		NA		<0.0002		1		4		<0.0005		6.3		<0.0005	
		Bottle #14 - DI Blank	9/23/2013	LAO-BS-14-092313	10243168014	10243168	0.56		0.02		NA		<0.0002		1		4.3		<0.0005		6.5		<0.0005	
Bench-Scale Evaluation	Storm Event No. 5	Bottle #1 - 15 % Composite Dilution	9/26/2013	LAO-BS-01-092613	10244062001	10244062	26.6		0.44		NA		0.0001	J	7.6		19		0.00029	J, B	47.1		0.0031	
		Bottle #2 - 15 % Composite Dilution	9/26/2013	LAO-BS-02-092613	10244062002	10244062	26.2		0.41		NA		0.00023		7.2		18.9		<0.0005		46.4		0.0029	
		Bottle #3 - 15 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-03-092613	10244062003	10244062	25.2		0.34		NA		<0.0002		6.8		18.3		<0.0005		45.8		0.0029	
		Bottle #4 - 15 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-04-092613	10244062004	10244062	26.6		0.4		NA		<0.0002		7.2		19.6		<0.0005		46.7		0.0032	
		Bottle #5 - 15 % MSD Dilution	9/26/2013	LAO-BS-05-092613	10244062005	10244062	26		0.39		NA		<0.0002		7.3		18.7		0.0002	J, B	46.5		0.0026	
		Bottle #6 - 15 % MSD Dilution	9/26/2013	LAO-BS-06-092613	10244062006	10244062	25.7		0.45		NA		0.00009	J	6.9		19.3		<0.0005		45.7		0.0025	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-07-092613	10244062007	10244062	28.1		0.37		NA		0.00011	J	7.4		20.7		<0.0005		50.4		0.0024	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-08-092613	10244062008	10244062	28		0.41		NA		0.00029		7.2		20.9		<0.0005		50.6		0.0026	
		Bottle #9 - 7.5 % MSD Dilution	9/26/2013	LAO-BS-09-092613	10244062009	10244062	27.4	M1	0.36		NA		0.0001	J	7.6		20.3		<0.0005	M1	49.6	M1	0.0018	
		Bottle #10 - 7.5 % MSD Dilution	9/26/2013	LAO-BS-10-092613	10244062010	10244062	28.7		0.47		NA		0.00003	J	7.4		21.8		<0.0005		51		0.0022	
		Bottle #11 - BTL Influent control	9/26/2013	LAO-BS-11-092613	10244062011	10244062	30.8		0.54		NA		<0.0002		7.9		22.3		0.00018	J, B	55.9		0.0022	
		Bottle #12 - BTL Influent control	9/26/2013	LAO-BS-12-092613	10244062012	10244062	27.8		0.54		NA		<0.0002		7.9		20.4		0.00022	J, B	50.6		0.0022	
		Bottle #13 - DI Blank	9/26/2013	LAO-BS-13-092613	10244062013	10244062	0.36		0.0011		NA		<0.0002		0.89		3.6		<0.0005		6		<0.0005	
		Bottle #14 - DI Blank	9/26/2013	LAO-BS-14-092613	10244062014	10244062	0.45		0.0034		NA		<0.0002		0.9		3.5		<0.0005		6.1		<0.0005	
BTL Routine Sample Event	Storm Event No. 1	BTL Location: SS-1	8/1/2013	LAO-SS-1-080113	10237712001	10237712	23.3	M1	NA		NA		<0.0002		NA		NA		<0.0005	M1	NA		0.0019	
		BTL Location: SS-1	8/8/2013	LAO-SS-1-080813	10238388001	10244313	21.8	M1	NA		NA		<0.0002		NA		NA		0.000064	J, B, M1	NA		0.0013	
		BTL Location: SS-1	8/12/2013	LAO-SS-1-081213	10238388002	10244313	19.5		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.00046	J
		BTL Location: SS-1T	8/12/2013	LAO-SS-1T-081213	10238388003	10244313	19.4		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.00044	J
		BTL Location: SS-2	8/5/2013	LAO-SS-2-080513	10237712002	10237712	32		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.01	
		BTL Location: SS-2	8/12/2013	LAO-SS-2-081213	10238388004	10244313	32.6		4.9		NA		<0.0002		8.7		28.5		<0.0005		53		0.0098	
		BTL Location: SS-3	8/12/2013	LAO-SS-3-081213	10238388005	10244313	36.9		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.013	
		BTL Location: SS-4	8/12/2013	LAO-SS-4-081213	10238388006	10244313	0.02	B	NA		NA		<0.0002		NA		NA		<0.0005		NA		<0.0005	
BTL Routine Sample Event	Storm Event No. 2	BTL Location: SS-1	8/22/2013	LAO-SS-1-082213	10239934001	10239934	19.4		NA	M1	NA		<0.0002		NA		NA		<0.0005	M1	NA		0.0015	
		BTL Location: SS-1	8/26/2013	LAO-SS-1-082613	10239934002	10239934	25		0.068		NA		<0.0002		8.9		18.2		<0.0005		57.3		0.0018	
		BTL Location: SS-2	8/26/2013	LAO-SS-2-082613	10239934003	10239934	31.3		4.3		NA		<0.0002		8.6		27.6		<0.0005		55.4		0.01	

2013 BTL Storm Water Treatment Analytical Summary

Project Phase	Storm Event	Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Magnesium Result (mg/L)	Magnesium Data Qualifier	Manganese Result (mg/L)	Manganese Data Qualifier	Mercury Dis Result (mg/L)	Mercury Dis Data Qualifier	Mercury TR Result (mg/L)	Mercury TR Data Qualifier	Potassium Result (mg/L)	Potassium Data Qualifier	Silica Result (mg/L)	Silica Data Qualifier	Silver Result (mg/L)	Silver Data Qualifier	Sodium Result (mg/L)	Sodium Data Qualifier	Uranium-238 Result (mg/L)	Uranium-238 Data Qualifer
BTL Routine Sample Event	Storm Event No. 3	BTL Location: SS-1	8/29/2013	LAO-SS-1-082913	10240734001	10240734	27.1		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.0015	
		BTL Location: SS-1	9/2/2013	LAO-SS-1-090213	10240734002	10240734	26.7		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.0015	
		BTL Location: SS-1	9/12/2013	LAO-SS-1-091213	10242261001	10242261	27.1	M1	NA		NA		<0.0002		NA		NA		0.000054	J, B, M1	NA		0.0015	
		BTL Location: SS-2	9/2/2013	LAO-SS-2-090213	10240734003	10240734	32	M1	NA		NA		<0.0002		NA		NA		<0.0005	M1	NA		0.0098	
BTL Routine Sample Event	Storm Event No. 4	BTL Location: SS-1	9/16/2013	LAO-SS-1-091613	10242261002	10242261	25.4		NA		NA		<0.0002		NA		NA		0.00011	J, B	NA		0.0013	
		BTL Location: SS-2	9/16/2013	LAO-SS-2-091613	10242261003	10242261	31.7		NA		NA		0.000059	J	NA		NA		0.000079	J,B	NA		0.0092	
		BTL Location: SS-1	9/19/2013	LAO-SS-1-091913	10243169001	10243169	26		NA		NA		<0.0002		NA		NA		0.000098	J	NA		0.0021	
BTL Routine Sample Event	Storm Event No. 5	BTL Location: SS-1	9/23/2013	LAO-SS-1-092313	10243169002	10243169	24.7		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.0015	
		BTL Location: SS-2	9/23/2013	LAO-SS-2-092313	10243169003	10243169	31.2		4.8		NA		0.00016	J	8.7		34.3		<0.0005		55.2		0.013	
		BTL Location: SS-3	9/23/2013	LAO-SS-3-092313	10243169004	10243169	35.4		NA		NA		<0.0002		NA		NA		<0.0005		NA		0.012	
		BTL Location: SS-4	9/23/2013	LAO-SS-4-092313	10243169005	10243169	0.0055		NA		NA		<0.0002		NA		NA		<0.0005		NA		<0.0005	
		BTL Location: SS-2T	9/23/2013	LAO-SS-2T-092313	10243169006	10243169	31.3		NA		NA		0.00007	J	NA		NA		<0.0005		NA		0.012	
Buffalo Gulch Storm Water	Trec Storm Water ISCO Samples	Butte Hill Surface Water Monitoring: BG-CLV-1	8/1/2013	SD0578-080113	10237680036	10237680	18.3		4.2		<0.0002		0.001		10.7		139		NA		6.2		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/22/2013	SD0634-082213	10239936012	10239936	14.2		1.8		<0.0002		0.00081		9.6		108		NA		6.4		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/26/2013	SD0654-082613	10240339042	10240339	13.2		2.3		E <0.0002		0.00073		8.6		112		NA		5.4		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/28/2013	SD0695-082813	10240702013	10240702	7		0.64		<0.0002		0.00031	B	4.6		45		NA		4.1		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/3/2013	SD0723-090313	10241031012	10241031	7.29		0.298		<0.0002		0.000058	J	5.33		17.3		NA		11.7		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/7/2013	SD0746-090713	10241536019	10241536	8.05		0.852		0.000037	J, B	0.00045		5.62		62.1		NA		4.37		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/13/2013	SD0777-091313	10242377019	10242377	14		3.8		<0.0002		0.00079		10		118		NA		4.1		NA	
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/17/2013	SD0849-091713	10243059018	10243059	7.1		0.47		0.0001	J	0.00016	J	5.1		32.4		NA		10.2		NA	
MSD Storm Water	Trec Storm Water ISCO Samples	Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/1/2013	SD0550-080113	10237680008	10237680	13		2.13		<0.0002		<0.0002		9.66		88.3		NA		4.35		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/1/2013	SD0551-080113	10237680009	10237680	12.2		2.2		<0.0002		<0.0002		9		76.2		NA		4.1		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/26/2013	SD0659-082613	10240339012	10240339	6.3		0.16		0.000048	J	0.00027		7.4		NA		NA		4.7		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/7/2013	SD0742-090713	10241536015	10241536	5.41		0.0776		0.000045	J, B	0.00016	J, B	5.52		18.2		NA		4.1		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/13/2013	SD0789-091313	10242377031	10242377	9.8		1.2		<0.0002		0.00071		9.4		87.7		NA		3.6		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/13/2013	SD0790-091313	10242377032	10242377	10.2		1.2		<0.0002		0.00067		9.7		92.1		NA		3.7		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/17/2013	SD0865-091713	10243059034	10243059	3.1		0.014		<0.0002		0.00012	J	2.8		7.6		NA		2.9		NA	

Key:
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
U - Indicates the compound was analyzed for, but not detected.
D8 - The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
B - Analyte was detected in the associated method blank.
ES - The reported result is estimated because one or more of the constituent results qualified as such.
H1 - Analysis conducted outside the recognized method holding time.
H3 - Sample was received or analysis requested beyond the recognized method holding time.
H6 - Analysis initiated outside of the 15 minute EPA recommended holding time.
M1 - Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1 - RPD value was outside control limits.
E - Analyte concentration exceeded the calibration range. The reported result is estimated.

2013 BTL Storm Water Treatment Analytical Summary

Project Phase	Storm Event	Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Zinc Dis Result (mg/L)	Zinc Dis Data Qualifier	Zinc TR Result (mg/L)	Zinc TR Data Qualifier	Alkalinity Result (mg/L)	Alkalinity Data Qualifier	Total Dissolved Solids Result (mg/L)	Total Dissolved Solids Data Qualifier	Total Suspended Solids Result (mg/L)	Total Suspended Solids Data Qualifier	Total Hardness Result (mg/L)	Total Hardness Data Qualifier	pH Result (S.U.)	pH Data Qualifier	NO3 Result (mg/L)	NO3 Data Qualifer	Sulfate Result (mg/L)	Sulfate Data Qualifer	Cl Result (mg/L)	Cl Data Qualifier
Bench-Scale Evaluation	Storm Event No. 1	Bottle #1 - 15 % Composite Dilution	8/6/2013	LAO-BS-01-081213	10238388007	10238388	NA		0.21		NA		NA		NA		366		NA		NA		NA		NA	
		Bottle #2 - 15 % Composite Dilution	8/6/2013	LAO-BS-02-081213	10238388008	10238388	NA		0.3		NA		NA		NA		359		NA		NA		NA		NA	
		Bottle #3 - 15 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-03-081213	10238388009	10238388	NA		0.26		NA		NA		NA		357		NA		NA		NA		NA	
		Bottle #4 - 15 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-04-081213	10238388010	10238388	NA		0.27		NA		NA		NA		354		NA		NA		NA		NA	
		Bottle #5 - 15 % MSD Dilution	8/6/2013	LAO-BS-05-081213	10238388011	10238388	NA		0.13		NA		NA		NA		351		NA		NA		NA		NA	
		Bottle #6 - 15 % MSD Dilution	8/6/2013	LAO-BS-06-081213	10238388012	10238388	NA		0.18		NA		NA		NA		357		NA		NA		NA		NA	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-07-081213	10238388013	10238388	NA		0.18		NA		NA		NA		376		NA		NA		NA		NA	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	8/6/2013	LAO-BS-08-081213	10238388014	10238388	NA		0.22		NA		NA		NA		379		NA		NA		NA		NA	
		Bottle #9 - 7.5 % MSD Dilution	8/6/2013	LAO-BS-09-081213	10238388015	10238388	NA		0.32		NA		NA		NA		376		NA		NA		NA		NA	
		Bottle #10 - 7.5 % MSD Dilution	8/6/2013	LAO-BS-10-081213	10238388016	10238388	NA		0.11		NA		NA		NA		343		NA		NA		NA		NA	
		Bottle #11 - BTL Influent control	8/6/2013	LAO-BS-11-081213	10238388017	10238388	NA		0.18		NA		NA		NA		394		NA		NA		NA		NA	
		Bottle #12 - BTL Influent control	8/6/2013	LAO-BS-12-081213	10238388018	10238388	NA		0.26		NA		NA		NA		387		NA		NA		NA		NA	
		Bottle #13 - DI Blank	8/6/2013	LAO-BS-13-081213	10238388019	10238388	NA		0.0031	J	NA		NA		NA		95.9		NA		NA		NA		NA	
		Bottle #14 - DI Blank	8/6/2013	LAO-BS-14-081213	10238388020	10238388	NA		0.0063		NA		NA		NA		86.6		NA		NA		NA		NA	
Bench-Scale Evaluation	Storm Event No. 2	Bottle #1 - 15 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-1-090313	10240736001	10240736	NA		0.37		NA		NA		NA		349		NA		NA		NA		NA	
		Bottle #2 - 15 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-2-090313	10240736002	10240736	NA		0.49		NA		NA		NA		352		NA		NA		NA		NA	
		Bottle #3 - 7.5 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-3-090313	10240736003	10240736	NA		0.38		NA		NA		NA		364		NA		NA		NA		NA	
		Bottle #4 - 7.5 % Buffalo Gulch Dilution	8/27/2013	LAO-BS-4-090313	10240736004	10240736	NA		0.3		NA		NA		NA		373		NA		NA		NA		NA	
		Bottle #5 - BTL Influent control	8/27/2013	LAO-BS-5-090313	10240736005	10240736	NA		0.33		NA		NA		NA		380		NA		NA		NA		NA	
		Bottle #6 - BTL Influent control	8/27/2013	LAO-BS-6-090313	10240736006	10240736	NA		0.23		NA		NA		NA		378		NA		NA		NA		NA	
		Bottle #7 - DI Blank	8/27/2013	LAO-BS-7-090313	10240736007	10240736	NA		0.0038	J	NA		NA		NA		62.4		NA		NA		NA		NA	
		Bottle #8 - DI Blank	8/27/2013	LAO-BS-8-090313	10240736008	10240736	NA		0.0026	J	NA		NA		NA		62.1		NA		NA		NA		NA	
Bench-Scale Evaluation	Storm Event No. 3	Bottle #9 - 15 % Composite Dilution	8/29/2013	LAO-BS-9-090313	10240736009	10240736	NA		0.2		NA		NA		NA		353		NA		NA		NA		NA	
		Bottle #10 - 15 % Composite Dilution	8/29/2013	LAO-BS-10-090313	10240736010	10240736	NA		0.23		NA		NA		NA		350		NA		NA		NA		NA	
		Bottle #11 - 15 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-11-090313	10240736011	10240736	NA		0.23		NA		NA		NA		361		NA		NA		NA		NA	
		Bottle #12 - 15 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-12-090313	10240736012	10240736	NA		0.22		NA		NA		NA		354		NA		NA		NA		NA	
		Bottle #13 - 15 % MSD Dilution	8/29/2013	LAO-BS-13-090313	10240736013	10240736	NA		0.26		NA		NA		NA		353		NA		NA		NA		NA	
		Bottle #14 - 15 % MSD Dilution	8/29/2013	LAO-BS-14-090313	10240736014	10240736	NA		0.26		NA		NA		NA		353		NA		NA		NA		NA	
		Bottle #15 - 7.5 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-15-090313	10240736015	10240736	NA		0.21		NA		NA		NA		369		NA		NA		NA		NA	
		Bottle #16 - 7.5 % Buffalo Gulch Dilution	8/29/2013	LAO-BS-16-090313	10240736016	10240736	NA		0.18		NA		NA		NA		369		NA		NA		NA		NA	
		Bottle #17 - 7.5 % MSD Dilution	8/29/2013	LAO-BS-17-090313	10240736017	10240736	NA		0.2		NA		NA		NA		378		NA		NA		NA		NA	
		Bottle #18 - 7.5 % MSD Dilution	8/29/2013	LAO-BS-18-090313	10240736018	10240736	NA		0.25		NA		NA		NA		373		NA		NA		NA		NA	
		Bottle #19 - BTL Influent control	8/29/2013	LAO-BS-19-090313	10240736019	10240736	NA		0.24		NA		NA		NA		385		NA		NA		NA		NA	
		Bottle #20 - BTL Influent control	8/29/2013	LAO-BS-20-090313	10240736020	10240736	NA		0.28		NA		NA		NA		402		NA		NA		NA		NA	
		Bottle #21 - DI Blank	8/29/2013	LAO-BS-21-090313	10240736021	10240736	NA		0.0085		NA		NA		NA		89.4		NA		NA		NA		NA	
		Bottle #22 - DI Blank	8/29/2013	LAO-BS-22-090313	10240736022	10240736	NA		0.0072		NA		NA		NA		90.7		NA		NA		NA		NA	
Bench-Scale Evaluation	Storm Event No. 4	Bottle #1 - 15 % Composite Dilution	9/23/2013	LAO-BS-01-092313	10243168001	10243168	NA		0.072		NA		NA		NA		359		NA		NA		NA		NA	
		Bottle #2 - 15 % Composite Dilution	9/23/2013	LAO-BS-02-092313	10243168002	10243168	NA		0.055		NA		NA		NA		355		NA		NA		NA		NA	
		Bottle #3 - 15 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-03-092313	10243168003	10243168	NA		0.058		NA		NA		NA		340		NA		NA		NA		NA	
		Bottle #4 - 15 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-04-092313	10243168004	10243168	NA		0.087		NA		NA		NA		347		NA		NA		NA		NA	
		Bottle #5 - 15 % MSD Dilution	9/23/2013	LAO-BS-05-092313	10243168005	10243168	NA		0.057		NA		NA		NA		353		NA		NA		NA		NA	
		Bottle #6 - 15 % MSD Dilution	9/23/2013	LAO-BS-06-092313	10243168006	10243168	NA		0.076		NA		NA		NA		355		NA		NA		NA		NA	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-07-092313	10243168007	10243168	NA		0.081		NA		NA		NA		381		NA		NA		NA		NA	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	9/23/2013	LAO-BS-08-092313	10243168009	10243168	NA		0.067		NA		NA		NA		373		NA		NA		NA		NA	
		Bottle #9 - 7.5 % MSD Dilution	9/23/2013	LAO-BS-09-092313	10243168008	10243168	NA		0.077		NA		NA		NA		376		NA		NA		NA		NA	
		Bottle #10 - 7.5 % MSD Dilution	9/23/2013	LAO-BS-10-092313	10243168010	10243168	NA		0.083		NA		NA		NA		382		NA		NA		NA		NA	
		Bottle #11 - BTL Influent control	9/23/2013	LAO-BS-11-092313	10243168011	10243168	NA		0.086		NA		NA		NA		393		NA		NA		NA		NA	
		Bottle #12 - BTL Influent control	9/23/2013	LAO-BS-12-092313	10243168012	10243168	NA		0.1		NA		NA		NA		395		NA		NA		NA		NA	
		Bottle #13 - DI Blank	9/23/2013	LAO-BS-13-092313	10243168013	10243168	NA		0.008		NA		NA		NA		98		NA		NA		NA		NA	
		Bottle #14 - DI Blank	9/23/2013	LAO-BS-14-092313	10243168014	10243168	NA		0.023		NA		NA		NA		104		NA		NA		NA		NA	
Bench-Scale Evaluation	Storm Event No. 5	Bottle #1 - 15 % Composite Dilution	9/26/2013	LAO-BS-01-092613	10244062001	10244062	NA		0.14		NA		NA		NA		337		NA		NA		NA		NA	
		Bottle #2 - 15 % Composite Dilution	9/26/2013	LAO-BS-02-092613	10244062002	10244062	NA		0.16		NA		NA		NA		331		NA		NA		NA		NA	
		Bottle #3 - 15 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-03-092613	10244062003	10244062	NA		0.14		NA		NA		NA		325		NA		NA		NA		NA	
		Bottle #4 - 15 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-04-092613	10244062004	10244062	NA		0.18		NA		NA		NA		338		NA		NA		NA		NA	
		Bottle #5 - 15 % MSD Dilution	9/26/2013	LAO-BS-05-092613	10244062005	10244062	NA		0.13		NA		NA		NA		331		NA		NA		NA		NA	
		Bottle #6 - 15 % MSD Dilution	9/26/2013	LAO-BS-06-092613	10244062006	10244062	NA		0.18		NA		NA		NA		331		NA		NA		NA		NA	
		Bottle #7 - 7.5 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-07-092613	10244062007	10244062	NA		0.14		NA		NA		NA		356		NA		NA		NA		NA	
		Bottle #8 - 7.5 % Buffalo Gulch Dilution	9/26/2013	LAO-BS-08-092613	10244062008	10244062	NA		0.16		NA		NA		NA		352		NA		NA		NA		NA	
		Bottle #9 - 7.5 % MSD Dilution	9/26/2013	LAO-BS-09-092613	10244062009	10244062	NA		0.15		NA		NA		NA		345		NA		NA		NA		NA	
		Bottle #10 - 7.5 % MSD Dilution	9/26/2013	LAO-BS-10-092613	10244062010	10244062	NA		0.17		NA		NA		NA		362		NA		NA		NA		NA	
		Bottle #11 - BTL Influent control	9/26/2013	LAO-BS-11-092613	10244062011	10244062	NA		0.19		NA		NA		NA		383		NA		NA		NA		NA	
		Bottle #12 - BTL Influent control	9/26/2013	LAO-BS-12-092613	10244062012	10244062	NA		0.22		NA		NA		NA		357		NA		NA		NA		NA	
		Bottle #13 - DI Blank	9/26/2013	LAO-BS-13-092613	10244062013	10244062	NA		0.0023	J	NA		NA		NA		77.7		NA		NA		NA		NA	
		Bottle #14 - DI Blank	9/26/2013	LAO-BS-14-092613	10244062014	10244062	NA		0.0061		NA		NA		NA		89.7		NA		NA		NA		NA	
BTL Routine Sample Event	Storm Event No. 1	BTL Location: SS-1	8/1/2013	LAO-SS-1-080113	10237712001	10237712	NA		0.08		NA		NA		NA		404		NA		NA		NA		NA	
		BTL Location: SS-1	8/8/2013	LAO-SS-1-080813	10238388001	10244313	NA		0.038		NA		NA		NA		380		NA		NA		NA		NA	
		BTL Location: SS-1	8/12/2013	LAO-SS-1-081213	10238388002	10244313	NA		0.035		19		743		<10.0		379		NA		0.54	M1	NA		NA	
		BTL Location: SS-1T	8/12/2013	LAO-SS-1T-081213	10238388003	10244313	NA		0.034		18.6		739		<10.0		379		NA		0.48		NA		NA	
		BTL Location: SS-2	8/5/2013	LAO-SS-2-080513	10237712002	10237712	NA		5		NA		NA		NA		442		NA		NA		NA		NA	
		BTL Location: SS-2	8/12/2013	LAO-SS-2-081213	10238388004	10244313	NA		5.4		77.8		806		<10.0		435		NA		0.6		NA		NA	
		BTL Location: SS-3	8/12/2013	LAO-SS-3-081213	10238388005	10244313	NA		7		66.1		945		22.1		465		NA		1.1		NA		NA	
		BTL Location: SS-4	8/12/2013	LAO-SS-4-081213	10238388006	10244313	NA		0.0061		<5.0		15		<10.0		0.32		NA		<0.10		NA		NA	
BTL Routine Sample Event	Storm Event No. 2	BTL Location: SS-1	8/22/2013	LAO-SS-1-082213	10239934001	10239934	NA		0.071		NA		NA		NA		436		NA		NA		NA		NA	
		BTL Location: SS-1	8/26/2013	LAO-SS-1-082613	10239934002	10239934	NA		0.081		NA		NA		NA		431		NA		NA		NA		NA	
		BTL Location: SS-2	8/26/2013	LAO-SS-2-082613	10239934003	10239934	NA		5.9		NA		NA		NA		465		NA		NA		NA		NA	

2013 BTL Storm Water Treatment Analytical Summary

Project Phase	Storm Event	Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Zinc Dis Result (mg/L)	Zinc Dis Data Qualifier	Zinc TR Result (mg/L)	Zinc TR Data Qualifier	Alkalinity Result (mg/L)	Alkalinity Data Qualifier	Total Dissolved Solids Result (mg/L)	Total Dissolved Solids Data Qualifier	Total Suspended Solids Result (mg/L)	Total Suspended Solids Data Qualifier	Total Hardness Result (mg/L)	Total Hardness Data Qualifier	pH Result (S.U.)	pH Data Qualifier	NO3 Result (mg/L)	NO3 Data Qualifier	Sulfate Result (mg/L)	Sulfate Data Qualifier	Cl Result (mg/L)	Cl Data Qualifier
BTL Routine Sample Event	Storm Event No. 3	BTL Location: SS-1	8/29/2013	LAO-SS-1-082913	10240734001	10240734	NA		0.064		NA		NA		NA		439		NA		NA		NA		NA	
		BTL Location: SS-1	9/2/2013	LAO-SS-1-090213	10240734002	10240734	NA		0.051		NA		NA		NA		439		NA		NA		NA		NA	
		BTL Location: SS-1	9/12/2013	LAO-SS-1-091213	10242261001	10242261	NA		0.059		NA		NA		NA		401		NA		NA		NA		NA	
		BTL Location: SS-2	9/2/2013	LAO-SS-2-090213	10240734003	10240734	NA		5.8	M1	NA		NA		NA		481		NA		NA		NA		NA	
BTL Routine Sample Event	Storm Event No. 4	BTL Location: SS-1	9/16/2013	LAO-SS-1-091613	10242261002	10242261	NA		0.051		NA		NA		NA		361		NA		NA		NA		NA	
		BTL Location: SS-2	9/16/2013	LAO-SS-2-091613	10242261003	10242261	NA		5.1		NA		NA		NA		432		NA		NA		NA		NA	
		BTL Location: SS-1	9/19/2013	LAO-SS-1-091913	10243169001	10243169	NA		0.088		NA		NA		NA		382		NA		NA		NA		NA	
BTL Routine Sample Event	Storm Event No. 5	BTL Location: SS-1	9/23/2013	LAO-SS-1-092313	10243169002	10243169	NA		0.11		28.1		701	H1	10.3	H1	386		NA		0.63	M1	NA		NA	
		BTL Location: SS-2	9/23/2013	LAO-SS-2-092313	10243169003	10243169	NA		6.1		95.2		764	H1	14.5	H1	434		7.7	H6	1.2		369	H1	55.6	H1
		BTL Location: SS-3	9/23/2013	LAO-SS-3-092313	10243169004	10243169	NA		7		67		877	H1	18.6	H1	469		NA		1.4		NA		NA	
		BTL Location: SS-4	9/23/2013	LAO-SS-4-092313	10243169005	10243169	NA		0.0027	J	<5.0		13	H1	<10.0	H1	0.11		NA		<0.10		NA		NA	
		BTL Location: SS-2T	9/23/2013	LAO-SS-2T-092313	10243169006	10243169	NA		6		99.7		794	H1	7.7 J	H1	435		NA		1.3		NA		NA	
Buffalo Gulch Storm Water	Trec Storm Water ISCO Samples	Butte Hill Surface Water Monitoring: BG-CLV-1	8/1/2013	SD0578-080113	10237680036	10237680	0.025		2.5		91.8	H1	NA		2310		NA		7.1	H6	1	H1	10.5		5.1	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/22/2013	SD0634-082213	10239936012	10239936	0.094		1.9		123	H1	NA		981		NA		6.9	H6	0.064	J, H1	14		12.3	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/26/2013	SD0654-082613	10240339042	10240339	0.063		1.9		76.5	H1	NA		1370		NA		6.5	H6	0.98	H1	9.8		6.9	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	8/28/2013	SD0695-082813	10240702013	10240702	0.064		0.63		39.5	H1	NA		197		NA		6.5	H6	0.87	H1	11.4		8.3	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/3/2013	SD0723-090313	10241031012	10241031	0.11		0.27		79.4	H1	NA		68.4		NA		6.4	H6	<0.10	H1, U	23.3		18.7	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/7/2013	SD0746-090713	10241536019	10241536	0.046		0.88		46.8	H1	NA		505		NA		6.5	H6	0.55	H1	5.6		8	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/13/2013	SD0777-091313	10242377019	10242377	0.048		2.6		88.1	H1	NA		1430		NA		7.1	H6	0.36	H1	8.2		4.2	H3
		Butte Hill Surface Water Monitoring: BG-CLV-1	9/17/2013	SD0849-091713	10243059018	10243059	0.051		0.45		57.5	H1	NA		191		NA		6.4	H6	2.2	H1	19		11.8	H3
MSD Storm Water	Trec Storm Water ISCO Samples	Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/1/2013	SD0550-080113	10237680008	10237680	0.022		2.2		98.8	H1	NA		1320		NA		6.7	H6	1.3	H1	13.6		12.5	H3
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/1/2013	SD0551-080113	10237680009	10237680	0.029		2.2		92.7	H1	NA		1010		NA		6.9	H6	1.2	H1	12.7		11.9	H3
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	8/26/2013	SD0659-082613	10240339012	10240339	<0.005		0.27		42.6	H1	NA		77.7		NA		6.4	H6	1.3	H1	16.2		17.3	H3
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/7/2013	SD0742-090713	10241536015	10241536	0.037		0.15		NA		NA		46		NA		NA		NA		10.1		NA	
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/13/2013	SD0789-091313	10242377031	10242377	0.021		1.5		58.2	H1	NA		785	H1	NA		7.1	H6	1.4	H1	8		5.9	H3
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/13/2013	SD0790-091313	10242377032	10242377	0.022		1.6		57.8	H1	NA		909	H1	NA		7.2	H6	1.2	H1	8		6.3	H3
		Butte Hill Surface Water Monitoring: MSD-CLV-3A	9/17/2013	SD0865-091713	10243059034	10243059	0.035		0.037		29.5	H1	NA		53.5	H1	NA		6.7	H6	1.1	H1	7.7		5.5	H3

Key:
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
U - Indicates the compound was analyzed for, but not detected.
D8 - The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
B - Analyte was detected in the associated method blank.
ES - The reported result is estimated because one or more of the constituent results qualified as such.
H1 - Analysis conducted outside the recognized method holding time.
H3 - Sample was received or analysis requested beyond the recognized method holding time.
H6 - Analysis initiated outside of the 15 minute EPA recommended holding time.
M1 - Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1 - RPD value was outside control limits.
E - Analyte concentration exceeded the calibration range. The reported result is estimated.

2014 BTL Analytical Summary

Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Aluminum TR Result (mg/L)	Aluminum TR Data Qualifier	Arsenic TR Result (mg/L)	Arsenic TR Data Qualifier	Cadmium TR Result (mg/L)	Cadmium TR Data Qualifier	Calcium Result (mg/L)	Calcium Data Qualifier	Copper TR Result (mg/L)	Copper TR Data Qualifier	Iron TR Result (mg/L)	Iron TR Data Qualifier	Lead TR Result (mg/L)	Lead TR Data Qualifier	Magnesium TR Result (mg/L)	Magnesium TR Data Qualifier	Mercury TR Result (mg/L)	Mercury TR Data Qualifier	Silver TR Result (mg/L)	Silver TR Data Qualifier	Uranium-238 TR Result (mg/L)	Uranium-238 TR Data Qualifier	Zinc TR Result (mg/L)	Zinc TR Data Qualifier	Alkalinity (Total) Result (mg/L)	Alkalinity (Total) Data Qualifer	Total Dissolved Solids Result (mg/L)	Total Dissolved Solids Data Qualifier	Total Suspended Solids Result (mg/L)	Total Suspended Solids Data Qualifier	Total Hardness Result (mg/L)	Total Hardness Data Qualifer	Nitrogen (NO2+NO3) Result (mg/L)	Nitrogen (NO2+NO3) Data Qualifer
BTL Effluent Routine Sample	01/02/2014 13:30	LAO-SS-1-010214	10254111001	10254111	0.0045		0.0044		0.00019		124	M1	0.0067		0.019	J	0.00016		34.2	M1	0.00003	U	0.00005	M1U	0.0089		0.053	M1	NA		NA		NA		450		NA	
BTL Effluent Routine Sample	01/06/2014 13:20	LAO-SS-1-010614	10254111002	10254111	0.0064		0.0043		0.00014		124		0.0062		0.016	J	0.00016		33.3		0.00003	U	0.00005	U	0.0088		0.049		NA		NA		NA		448		NA	
BTL Effluent Routine Sample	01/09/2014 12:15	LAO-SS-1-010914	10254828001	10254828	0.0015	U	0.0036		0.00014		118	M1	0.0055		0.017	J	0.00016		33.6	M1	0.00003	U	0.000078	B,M1J	0.0078		0.038		NA		NA		NA		433		NA	
BTL Effluent Routine Sample	01/13/2014 14:14	LAO-SS-1-011314	10254828002	10254828	0.0036	J	0.0036		0.00014		118		0.0071		0.021	J	0.00022		33.7		0.00003	U	0.000095	BJ	0.008		0.045		NA		NA		NA		434		NA	
BTL Effluent Routine Sample	01/16/2014 13:00	LAO-SS-1-011614	10255482001	10255482	0.0025	J	0.0038		0.00013		128	M1	0.0057		0.012	J	0.00012		32.7	M1	0.00003	U	0.00005	M1U	0.007		0.037		NA		NA		NA		454		NA	
BTL Effluent Routine Sample	01/20/2014 12:45	LAO-SS-1-012014	10255482002	10255482	0.0015	U	0.0035		0.0001		130		0.0042		0.0059	U	0.000046	U	36.4		0.00003	U	0.000068	BJ	0.0067		0.023		50		781		5	U	474		0.29	M1
BTL Effluent Routine Sample	01/23/2014 14:15	LAO-SS-1-012314	10256165001	10256165	0.0045		0.0039		0.00014		127	M1	0.0071		0.015	J	0.00019		37.1	M1	0.00003	U	0.00005	M1U	0.0076		0.045		NA		NA		NA		470		NA	
BTL Effluent Routine Sample	01/27/2014 13:30	LAO-SS-1-012714	10256165002	10256165	0.0027	J	0.0037		0.00016		131		0.0069		0.018	J	0.00015		37.1		0.00003	U	0.00005	U	0.0077		0.049		NA		NA		NA		481		NA	
BTL Effluent Routine Sample	01/30/2014 12:00	LAO-SS-1-013014	10256732001	10256732	0.014		0.0035		0.00023		123	M1	0.0082		0.035	J	0.00054		34.2	M1	0.00003	U	0.00005	U	0.0079		0.061		NA		NA		NA		448		NA	
BTL Effluent Routine Sample	02/03/2014 13:57	LAO-SS-1-020314	10256732002	10256732	0.013		0.0034		0.00017		119		0.0083		0.031	J	0.00047		35.1		0.00003	U	0.00014	BJ	0.0081		0.057		NA		NA		NA		442		NA	
BTL Effluent Routine Sample	02/06/2014 14:30	LAO-SS-1-020614	10257383001	10257383	0.0037	J	0.0033		0.00017		124	M1	0.0067		0.016	J	0.00015		35.8	M1	0.00003	U	0.00005	M1U	0.0088		0.053		NA		NA		NA		458		NA	
BTL Effluent Routine Sample	02/10/2014 13:45	LAO-SS-1-021014	10257383002	10257383	0.0082		0.0034		0.00012		129		0.0036		0.0065	J	0.000046	U	37.1		0.00003	U	0.00005	U	0.0096		0.022		NA		NA		NA		475		NA	
BTL Effluent Routine Sample	02/13/2014 12:50	LAO-SS-1-021314	10257999001	10257999	0.01		0.0037		0.00022		122	M1	0.0087		0.03	J	0.00047		33	M1	0.00003	U	0.00005	M1U	0.0092		0.07		NA		NA		NA		441		NA	
BTL Effluent Routine Sample	02/17/2014 15:10	LAO-SS-1-021714	10257999002	10257999	0.0081		0.0036		0.00018		121		0.012		0.027	J	0.00038		38.4		0.00003	U	0.000092	BJ	0.0091		0.057		58		803		5	U	459		0.2	M1
BTL Effluent Routine Sample	02/20/2014 14:20	LAO-SS-1-022014	10258670001	10258670	0.0035	J	0.0036		0.00017		123	M1	0.0099		0.018	J	0.00019		44.8	M1	0.00003	BJ	0.00016	B,M1J	0.0083		0.053		NA		NA		NA		492		NA	
BTL Effluent Routine Sample	02/24/2014 14:15	LAO-SS-1-022414	10258670002	10258670	0.0094		0.0034		0.00015		122		0.0091		0.028	J	0.00016		42.8		0.00003	BJ	0.000074	BJ	0.0078		0.049		NA		NA		NA		481		NA	
BTL Effluent Routine Sample	02/27/2014 15:45	LAO-SS-1-022714	10259276001	10259276	0.0039	J	0.0032		0.00015		105		0.0077		0.015	J	0.00015		37.9		0.000031	BJ	0.00005	U	0.008		0.048		NA		NA		NA		418		NA	
BTL Effluent Routine Sample	03/03/2014 13:50	LAO-SS-1-030314	10259276002	10259276	0.0078		0.0033		0.00016		104		0.0078		0.023	J	0.00021		37.3		0.000031	BJ	0.00005	U	0.0082		0.053		NA		NA		NA		413		NA	
BTL Effluent Routine Sample	03/06/2014 11:00	LAO-SS-1-030614	10259970001	10259970	0.012		0.0033		0.00017		113		0.0073		0.017	J	0.00019		37.4		0.00003	U	0.00005	U	0.0083		0.054		NA		NA		NA		435		NA	
BTL Effluent Routine Sample	03/10/2014 14:45	LAO-SS-1-031014	10259970002	10259970	0.009		0.0038		0.00015		107		0.012		0.021	J	0.00046		42.6		0.00003	U	0.00005	U	0.0067		0.05		NA		NA		NA		442		NA	
BTL Effluent Routine Sample	03/13/2014 12:00	LAO-SS-1-031314	10260584001	10260584	0.012		0.0036		0.0002		95.8	M1	0.017		0.031	J	0.00038		34.8	M1	0.000055	BJ	0.00005	M1U	0.005		0.054		NA		NA		NA		383		NA	
BTL Effluent Routine Sample	03/17/2014 12:45	LAO-SS-1-031714	10260584002	10260584	0.0088		0.0027		0.00019		99.9		0.014		0.022	J	0.00029		32.2		0.000054	BJ	0.00005	U	0.0045		0.049		44		665		5	U	382		0.75	
BTL Effluent Routine Sample	03/20/2014 13:00	LAO-SS-1-032014	10261270001	10261270	0.012	B	0.0026		0.0002		92.2		0.012		0.74		0.00022		28.4		0.000026	U	0.000056	U	0.0048		0.038		NA		NA		NA		347		NA	
BTL Effluent Routine Sample	03/24/2014 13:50	LAO-SS-1-032414	10261270002	10261270	0.0094	BJ	0.0028		0.0002		109		0.0098		0.048	J	0.00026		32.2		0.000026	U	0.000056	U	0.0059		0.04		NA		NA		NA		404		NA	
BTL Effluent Routine Sample	03/27/2014 14:00	LAO-SS-1-032714	10261909001	10261909	0.0089	BJ	0.0025		0.00017		111		0.0084		0.02	J	0.00019		30.4		0.000026	U	0.000056	U	0.0058		0.042		NA		NA		NA		402		NA	
BTL Effluent Routine Sample	03/31/2014 11:02	LAO-SS-1-033114	10261909002	10261909	0.049		0.0027		0.0002		115		0.011		0.062		0.00075		30.7		0.000026	U	0.000056	U	0.0057		0.054		NA		NA		NA		414		NA	
BTL Effluent Routine Sample	04/03/2014 08:00	LAO-SS-1 040314	10262594001	10262594	0.0092	J	0.0032		0.00019		116	M1	0.008		0.019	J	0.00028		35.8	M1	0.000026	U	0.000056	U	0.0062		0.044		NA		NA		NA		437		NA	
BTL Effluent Routine Sample	04/03/2014 11:18	LAO-SS-1 040714	10262594002	10262594	0.016		0.0038		0.0002		113		0.01		0.04	J	0.00083		36		0.000026	U	0.000056	U	0.0058		0.04		NA		NA		NA		430		NA	
BTL Effluent Routine Sample	04/10/2014 16:30	LAO-SS-1-041014	10263484001	10263484	0.056		0.0042		0.00019		117		0.012		0.09		0.0013		33.7		0.000026	U	0.000056	U	0.0056		0.041		NA		NA		NA		431		NA	
BTL Effluent Routine Sample	04/14/2014 11:55	LAO-SS-1-041414	10263484002	10263484	0.024		0.0049		0.00019		111		0.013		0.049	J	0.0012		32.2		0.000026	U	0.000056	U	0.0048		0.05		36.9		739		10		409		0.31	M1
BTL Effluent Routine Sample	04/17/2014 14:00	LAO-SS-1-041714	10264241001	10264241	0.0075	J	0.004		0.00014		114		0.0066		0.016	J	0.0003		31		0.000026	U	0.000056	U	0.0047		0.026		NA		NA		NA		412		NA	
BTL Effluent Routine Sample	04/21/2014 10:08	LAO-SS-1-042114	10264241002	10264241	0.024		0.0045		0.00013		113		0.0098		0.044	J	0.00077		30.5		0.000026	U	0.000056	U	0.0046		0.035		NA		NA		NA		408		NA	
BTL Effluent Routine Sample	04/24/2014 15:15	LAO-SS-1-042414	10265237001	10265237	0.0083	BJ	0.0046		0.00015		116	M1	0.0076		0.019	J	0.00035		32.5	M1	0.000026	U	0.000061	J	0.0046		0.025		NA		NA		NA		424		NA	
BTL Effluent Routine Sample	04/28/2014 14:00	LAO-SS-1-042814	10265237002	10265237	0.0072	BJ	0.0043		0.00014		113		0.0075		0.017	J	0.00037		31.5		0.000026	U	0.000056	U	0.0045		0.028		NA		NA		NA		412		NA	
BTL Effluent Routine Sample	05/01/2014 15:20	LAO-SS-1-050114	10266033001	10266033	0.0012	U	0.0038		8.1E-05		86.8	M1	0.0042		0.008	U	0.000046	U	28.6	M1	0.000026	U	0.000056	U	0.0042		0.0091		NA		NA		NA		334		NA	
BTL Effluent Routine Sample	05/05/2014 11:06	LAO-SS-1-050514	10266033002	10266033	0.026		0.0041		0.00014		160		0.013		0.051		0.001		52.3		0.000026	U	0.000056	U	0.0038		0.04		NA		NA		NA		614		NA	
BTL Effluent Routine Sample	05/08/2014 10:30	LAO-SS-1-050814	10266930001	10266930	0.05		0.0045		0.00016		110		0.011		0.069		0.0011		30.2		0.000026	U	0.000056	U	0.0037		0.034		NA		NA		NA		398		NA	
BTL Effluent Routine Sample	05/12/2014 13:50	LAO-SS-1-051214	10266930002	10266930	0.03		0.0043		0.00014		117	M1	0.012		0.051		0.00084		31.9	M1	0.000026	U	0.000056	U	0.0041		0.035		35.8		711		5	J	422		1	M1
BTL Effluent Routine Sample	05/15/2014 12:37	LAO-SS-1-051514	10267911001	10267911	0.0074	BJ	0.0044		0.0001		113	M1	0.0077		0.032	BJ	0.00031		29.4	M1	0.000026	U	0.000056	U	0.0041		0.023		NA		NA		NA		403		NA	
BTL Effluent Routine Sample	05/19/2014 10:45	LAO-SS-1-051914	10267911002	10267911	0.025		0.004		0.00013		113		0.011		0.1	B	0.00068		29		0.000026	U	0.000056	U	0.0028		0.028		NA		NA		NA		402		NA	
BTL Effluent Routine Sample	05/22/2014 12:30	LAO-SS-1-052214	10268921001	10268921	0.054		0.0048		0.00015		111	M1	0.014		0.079		0.0015		29.4	M1	0.000026	U	0.000065	J	0.0023		0.04		NA		NA		NA		398		NA	
BTL Effluent Routine Sample	05/26/2014 09:25	LAO-SS-1-052614	10268921002	10268921	0.0072	J	0.0045		0.00011		112		0.0082		0.017	J	0.00047		29.9		0.000026	U	0.000056	U	0.0024		0.019		NA		NA		NA		404		NA	
BTL Effluent Routine Sample	05/29/2014 11:28	LAO-SS-1-052914	10269379001	10269379	0.0061	J	0.0048		0.00014		114		0.0082		0.018	J	0.00038		30.8		0.000026	U	0.000056	U	0.0027		0.019		NA		NA		NA		413		NA	
BTL Effluent Routine Sample	06/02/2014 10:00	LAO-SS-1-060214	10269379002	10269379	0.01		0.0047		0.00013		112		0.01		0.022	J	0.00058		30.7		0.000026	U	0.000056	U	0.0034		0.022		NA		NA		NA		407		NA	
BTL Effluent Routine Sample	06/05/2014 12:00	LAO-SS-1-060514	10270192001	10270192	0.048		0.0056		0.00018		120	M1	0.015		0.076		0.0016		32.6	M1	0.000026	U	0.00014	J	0.0036		0.043		NA		NA		NA		433		NA	
BTL Effluent Routine Sample	06/09/2014 11:15	LAO-SS-1-060914	10270192002	10270192	0.02		0.0057		0.00014		126		0.012		0.041	J	0.001		34.1		0.000026	U	0.000056	U	0.0037		0.031		NA		NA		NA		454		NA	
BTL Effluent Routine Sample	06/12/2014 13:30	LAO-SS-1-061214	10270965001	10270965	0.047		0.0058		0.00018		120	M1	0.012		0.074		0.0017		30.8	M1	0.000026	U	0.00014	J	0.0033		0.034		NA		NA		NA		426		NA	
BTL Effluent Routine Sample	06/16/2014 11:06	LAO-SS-1-061614	10270965002	10270965	0.017	B	0.0053		0.00014		115		0.0093		0.032	J	0.00065		29.8		0.000026	U	0.00013	J	0.0032		0.023		33.7		749		5	D8U	410		0.52	M1
BTL Effluent Routine Sample	06/19/2014 14:30	LAO-SS-1-061914	10271825001	10271825	0.041		0.0053		0.00015		111	M1	0.015		0.065		0.0016		30.3	M1	0.000026	U	0.000056	U	0.003		0.039		NA		NA		NA		402		NA	
BTL Effluent Routine Sample	06/23/2014 11:30	LAO-SS-1-062314	10271825002	10271825	0.015		0.0047		0.00011		103		0.0092		0.041	J	0.00057		28.4		0.000026	U	0.000056	U	0.003		0.026		NA		NA		NA		373		NA	
BTL Effluent Routine Sample	06/26/2014 11:30	LAO-SS-1-062614	10272778001	10272778	0.013	B	0.0049		0.00014		105	M1	0.0085		0.033	J	0.00059		27.1	M1	0.000026	U	0.000085	J	0.0025		0.026		NA		NA		NA		374		NA	
BTL Effluent Routine Sample	06/30/2014 11:10	LAO-SS-1-063014	10272778002	10272778	0.017	B	0.0051		0.00014		106		0.01		0.037	J	0.0009		26.9		0.000026	U	0.000056	U	0.0018		0.027		NA		NA		NA		375		NA	
BTL Effluent Routine Sample	07/03/2014 14:30	LAO-SS-1-070314	10273240001	10273240	0.098	M1	0.0057		0.0002		94.1	M1	0.019		0.14		0.0029		24.2	M1	0.000026	U	0.00018	J	0.0017		0.054		NA		NA		NA		334		NA	
BTL Effluent Routine Sample	07/07/2014 10:20	LAO-SS-1-070714	10273240002	10273240	0.037		0.0052		0.00019		111		0.014		0.063		0.0015		27.8		0.000026	U	0.00015	J	0.0013		0.036		NA		NA		NA		392		NA	
BTL Effluent Routine Sample	07/10/2014 11:00	LAO-SS-1-071014	10273983001	10273983	0.058	M1	0.0059		0.00011		129	M1	0.012		0.066		0.0014		32.3	M1	0.000026	U	0.000056	U	0.0014		0.024		NA		NA		NA		454		NA	
BTL Effluent Routine Sample	07/14/2014 10:15	LAO-SS-1-071414	10273983002	10273983	0.098		0.0063		0.00022		123		0.02		0.14		0.0024		30.3		0.000026	U	0.00022	J	0.0014		0.062		29.2		715		5	U	431		0.34	
BTL Effluent Routine Sample	07/17/2014 11:25	LAO-SS-1-071714	10274756001	10274756	0.11	M1	0.0064		0.00024		130	M1	0.018		0.15		0.0027		31.7	M1	0.0001	J	0.000056	U	0.0012		0.062		NA		NA		NA		454		NA	
BTL Effluent Routine Sample	07/21/2014 09:50	LAO-SS-1-072114	10274756002	10274756	0.11		0.0066		0.00026		129		0.021		0.16		0.0028		32.5		0.000026	U	0.000083	J	0.0013		0.078		NA		NA		NA		455		NA	
BTL Effluent Routine Sample	07/24/2014 08:30	LAO-SS-1-072414	10275583001	10275583	0.12	M1	0.006	M1	0.00026	M1	117	M1	0.021	M1	0.18	M1	0.0031	M1	28.1	M1	0.000026	U	0.000069	M1J	0.0012	M1	0.072	M1	NA		NA		NA		407		NA	
BTL Effluent Routine Sample	07/28/2014 12:56	LAO-SS-1-072814	10275583002	10275583	0.086		0.006		0.00018		118		0.019		0.14		0.0025		25.8		0.000026	U	0.000056	U	0.00056		0.053		NA		NA		NA		400		NA	
BTL Effluent Routine Sample	07/31/2014 11:40	LAO-SS-1-073114	10276503001	10276503	0.021		0.0034		8.3E-05		130		0.0084		0.035	J	0.00076		20.3		0.000026	U	0.000056	U	0.00037	J	0.025		NA		NA		NA		408		NA	
BTL Effluent Routine Sample	08/04/2014 09:30	LAO-SS-1-080414	10276503002	10276503	0.03		0.0047		0.0001		125		0.01		0.04	J	0.0009		24.7		0.000026	U	0.000056	U	0.00068		0.029		NA		NA		NA		413		NA	
BTL Effluent Routine Sample	08/07/2014 13:00	LAO-SS-1-080714	10277290001	10277290	0.12	M1	0.0059		0.00025		120	M1	0.024		0.17		0.0036		26.6	M1	0.000026	U	0.000056	U	0.00091		0.07		NA		NA		NA		410		NA	
BTL Effluent Routine Sample	08/11/2014 09:22	LAO-SS-1-081114	10277290002	10277290	0.026		0.005		0.00014		118		0.01		0.042	J	0.00091		28.1		0.000026	U	0.000056	U	0.00088		0.031		NA		NA		NA		411		NA	
BTL Effluent Routine Sample	08/14/2014 12:00	LAO-SS-1-081414	10278295001	10278295	0.07		0.005		0.00012		116	M1	0.012		0.071		0.0016		27.8	M1	0.000026	U	0.000056	U	0.0007		0.035		NA		NA		NA		404		NA	
BTL Effluent Routine Sample	08/18/2014 10:40	LAO-SS-1-081814	10278295002	10278295	0.095		0.0049		0.00024		113		0.019		0.14		0.0031		26.5		0.000026	U	0.00014	J	0.00072		0.06		25.4		706		8	J	392		0.23	M1
BTL Effluent Routine Sample	08/21/2014 10:00	LAO-SS-1-082114	10279209001	10279209	0.0083	J	0.0037		0.00012		102		0.0077		0.018	J	0.00043		23.9		0.000026	U	0.000056	U	0.00071		0.022		NA		NA		NA		353		NA	
BTL Effluent Routine Sample	08/25/2014 11:30	LAO-SS-1-082514	10279209002	10279209	0.015		0.0033		0.00012		99.6		0.0072		0.023	J	0.00044		25		0.000026	U	0.000056	U	0.0011		0.021		NA		NA		NA		352		NA	
BTL Effluent Routine Sample	08/28/2014 13:30	LAO-SS-1-082814	10279969001	10279969	0.023		0.003		5.4E-05	J	107	M1	0.003		0.008	U	0.000046	U	25.7		0.000026	U	0.00012	J	0.001		0.0036	J	NA		NA		NA		374		NA	
BTL Effluent Routine Sample	09/01/2014 08:46	LAO-SS-1-090114	10279969002	10279969	0.0027	BJ	0.0028		5.2E-05	J	106		0.0024		0.008	U	0.000046	U	26.2		0.000026	U	0.000056	U	0.001		0.0043	J	NA		NA		NA		373		NA	
BTL Effluent Routine Sample	09/04/2014 11:38	LAO-SS-1-090414	10280723001	10280723	0.018		0.0033		0.00016		108		0.012		0.036	J	0.0011		27.6		0.000026	U	0.000056	U	0.0015		0.036		NA		NA		NA		383		NA	
BTL Effluent Routine Sample	09/08/2014 14:00	LAO-SS-1-090814	10280723002	10280723	0.0042	J	0.0031		4.9E-05	J	105		0.0031		0.058		0.000046	U	26.9		0.000026	U	0.000056	U	0.0016		0.0033	J	NA		NA		NA		373		NA	
BTL Effluent Routine Sample	09/11/2014 10:45	LAO-SS-1-091114	10281591001	10281591	0.0049	J	0.0034		0.00009		110	M1	0.0065		0.015	BJ	0.00033		29.6	M1	0.000026	U	0.000056	U	0.0017		0.022		NA		NA		NA		396		NA	
BTL Effluent Routine Sample	09/15/2014 11:36	LAO-SS-1-091514	10281591002	10281591	0.027		0.0034		0.00016		108		0.011		0.056	B	0.0011		29.6		0.000026	U	0.000056	U	0.0021		0.042		27.7		726		5	U	391		0.41	
BTL Effluent Routine Sample	09/18/2014 09:10	LAO-SS-1-091814	10282611001	10282611	0.048		0.0032		0.00018		110	M1	0.013		0.081		0.0016		29.2	M1	0.000026	U	0.000056	U	0.002		0.05		NA		NA		NA		394		NA	
BTL Effluent Routine Sample	09/22/2014 12:40	LAO-SS-1-092214	10282611002	10282611	0.055		0.0028		0.00014		112		0.0074		0.048	J	0.00064		29.3		0.000026	U	0.000056	U	0.0013		0.038		NA		NA		NA		400		NA	
BTL Effluent Routine Sample	09/25/2014 10:15	LAO-SS-1-092514	10283373001	10283373	0.0068	J	0.0031		0.00015		125	M1	0.0061		0.018	J	0.00028		32.8	M1	0.000026	U	0.00015	J	0.0012		0.023		NA		NA		NA		447		NA	
BTL Effluent Routine Sample	09/29/2014 11:30	LAO-SS-1-092914	10283373002	10283373	0.033		0.0032		0.00031		122		0.017		0.076		0.0021		31.8		0.000026	U	0.000064	J	0.0014		0.075		NA		NA		NA		435		NA	
BTL Effluent Routine Sample	10/02/2014 10:55	LAO-SS-1-100214	10284426001	10284426	0.0084	J	0.0027		0.00014		109		0.007		0.013	J	0.00051		29.7		0.000026	U	0.000056	U	0.0016		0.028		NA		NA		NA		394		NA	
BTL Effluent Routine Sample	10/06/2014 14:00	LAO-SS-1-100614	10284426002	10284426	0.006	J	0.0025		0.00013		110		0.0065		0.013	J	0.00023		30.2		0.000026	U	0.000056	U	0.0016		0.028		NA		NA		NA		399		NA	
BTL Effluent Routine Sample	10/09/2014 10:00	LAO-SS-1 100914	10285156001	10285156	0.027		0.0028		0.00017		129	M1	0.0094		0.047	J	0.00092		37.4	M1	0.000026	U	0.000056	U	0.0016		0.039		NA		NA		NA		477		NA	
BTL Effluent Routine Sample	10/13/2014 11:50	LAO-SS-1 101314	10285156002	10285156	0.052		0.0032		0.00022		111		0.013		0.083		0.0016		32.4		0.000026	U	0.000056	U	0.0021		0.055		28.9		714		5	U	411		0.36	M1
BTL Effluent Routine Sample	10/16/2014 14:25	LAO-SS-1-101614	10285982001	10285982	0.012		0.0029		0.00016		110		0.008		0.026	J	0.00047		33.4		0.000026	U	0.000056	U	0.002		0.034		NA		NA		NA		413		NA	
BTL Effluent Routine Sample	10/20/2014 12:00	LAO-SS-1-102014	10285982002	10285982	0.0071	J	0.0025		0.00018		123		0.0069		0.016	J	0.00025		37.9		0.000026	U	0.000056	U	0.0025		0.041		NA		NA		NA		462		NA	
BTL Effluent Routine Sample	10/23/2014 14:40	LAO-SS-1-102314	10286988001	10286988	0.013		0.0023		0.00026		112		0.009		0.027	J	0.00065		30.8		0.000026	U	0.000056	U	0.0031		0.054		NA		NA		NA		406		NA	
BTL Effluent Routine Sample	10/27/2014 12:00	LAO-SS-1-102714	10286988002	10286988	0.0048	J	0.0019		0.00018		112		0.0057		0.013	J	0.00021		30		0.000026	U	0.000056	U	0.0027		0.033		NA		NA		NA		403		NA	
BTL Effluent Routine Sample	10/30/2014 12:00	LAO-SS-1-103014	10287627001	10287627	0.0045	J	0.0019		0.00018		107		0.0055		0.022	BJ	0.00021		31.1		0.000026	U	0.000084	J	0.0028		0.036		NA		NA		NA		396		NA	
BTL Effluent Routine Sample	11/03/2014 11:05	LAO-SS-1-110314	10287627002	10287627	0.0027	J	0.0017		0.00015		103		0.0054		0.017	BJ	0.00019		30.7		0.000026	U	0.000056	U	0.0034		0.032		NA		NA		NA		385		NA	

2014 BTL Analytical Summary

Sample Description	Sample Date	Field Sample Identification	Lab Sample Identification	Pace Project No.	Aluminum TR Result (mg/L)	Aluminum TR Data Qualifier	Arsenic TR Result (mg/L)	Arsenic TR Data Qualifier	Cadmium TR Result (mg/L)	Cadmium TR Data Qualifier	Calcium Result (mg/L)	Calcium Data Qualifier	Copper TR Result (mg/L)	Copper TR Data Qualifier	Iron TR Result (mg/L)	Iron TR Data Qualifier	Lead TR Result (mg/L)	Lead TR Data Qualifier	Magnesium TR Result (mg/L)	Magnesium TR Data Qualifier	Mercury TR Result (mg/L)	Mercury TR Data Qualifier	Silver TR Result (mg/L)	Silver TR Data Qualifier	Uranium-238 TR Result (mg/L)	Uranium-238 TR Data Qualifier	Zinc TR Result (mg/L)	Zinc TR Data Qualifier	Alkalinity (Total) Result (mg/L)	Alkalinity (Total) Data Qualifer	Total Dissolved Solids Result (mg/L)	Total Dissolved Solids Data Qualifier	Total Suspended Solids Result (mg/L)	Total Suspended Solids Data Qualifier	Total Hardness Result (mg/L)	Total Hardness Data Qualifer	Nitrogen (NO2+NO3) Result (mg/L)	Nitrogen (NO2+NO3) Data Qualifer
BTL Effluent Routine Sample	11/06/2014 14:00	LAO-SS-1-110614	10288403001	10288403	0.0023	J	0.002		0.00018		112	M1	0.0052		0.013	J	0.00016		32	M1	0.000026	U	0.00011	J	0.0033		0.032		NA		NA		NA		412		NA	
BTL Effluent Routine Sample	11/10/2014 11:00	LAO-SS-1-111014	10288403002	10288403	0.0062	J	0.002		0.00018		111		0.0052		0.015	J	0.00016		32.2		0.000026	U	0.000056	U	0.0038		0.034		NA		NA		NA		409		NA	
BTL Effluent Routine Sample	11/13/2014 11:30	LAO-SS-1-111314	10289093001	10289093	0.0012	M1,R1U	0.0018		0.0002		110	M1	0.0052		0.017	J	0.00016		32	M1	0.000026	U	0.0001	J	0.0046		0.045		NA		NA		NA		405		NA	
BTL Effluent Routine Sample	11/17/2014 11:35	LAO-SS-1-111714	10289093002	10289093	0.016		0.002		0.0003		117		0.011		0.048	J	0.00092		35		0.000026	U	0.000056	U	0.0065		0.081		39.7		648		5	U	435		0.6	
BTL Effluent Routine Sample	11/20/2014 10:30	LAO-SS-1-112014	10289895001	10289895	0.0041	J	0.0021	B	0.0002		116	M1	0.0075		0.017	J	0.00015		34.2	M1	0.000026	U	0.000056	U	0.0073		0.058		NA		NA		NA		431		NA	
BTL Effluent Routine Sample	11/24/2014 13:40	LAO-SS-1-112414	10289895002	10289895	0.0038	J	0.0022	B	0.00017		107		0.0066		0.015	J	0.00011		31.8		0.000026	U	0.000056	U	0.0074		0.052		NA		NA		NA		398		NA	
BTL Effluent Routine Sample	11/27/2014 09:45	LAO-SS-1-112714	10290312001	10290312	0.0024	J	0.0022		0.0002		106	M1	0.0064		0.014	J	0.00017		32.7	M1	0.000026	U	0.00016	J	0.007		0.049		NA		NA		NA		399		NA	
BTL Effluent Routine Sample	12/01/2014 11:30	LAO-SS-1-120114	10290312002	10290312	0.0028	J	0.0019		0.00015		108		0.0076		0.012	J	0.00015		32.8		0.000026	U	0.000066	J	0.0056		0.041		NA		NA		NA		405		NA	
BTL Effluent Routine Sample	12/04/2014 11:30	LAO-SS-1-120414	10291008001	10291008	0.019		0.002		0.00025		105	M1	0.011		0.035	J	0.00069		32.4	M1	0.000026	U	0.000056	U	0.0051		0.056		NA		NA		NA		395		NA	
BTL Effluent Routine Sample	12/08/2014 10:30	LAO-SS-1-120814	10291008002	10291008	0.0024	J	0.0018		0.00016		104		0.0058		0.012	J	0.000083	BJ	32.2		0.000026	U	0.00013	J	0.0056		0.042		NA		NA		NA		393		NA	
BTL Effluent Routine Sample	12/11/2014 15:40	LAO-SS-1-121114	10291754001	10291754	0.0035	J	0.002		0.00016		109	M1	0.0059		0.01	J	0.000084	J	34.1	M1	0.000026	U	0.000056	U	0.0058		0.044		NA		NA		NA		412		NA	
BTL Effluent Routine Sample	12/15/2014 11:05	LAO-SS-1-121514	10291754002	10291754	0.0058	J	0.0018		0.00013		101		0.0077		0.015	J	0.00048		31.8		0.000026	U	0.000056	U	0.005		0.037		29.9		676		5	U	383		0.88	
BTL Effluent Routine Sample	12/18/2014 10:30	LAO-SS-1-121814	10292874001	10292874	0.0015	J	0.0017		0.00016		113	M1	0.0058		0.02	J	0.00012		34	M1	0.000026	U	0.00016	J	0.0049		0.038		NA		NA		NA		422		NA	
BTL Effluent Routine Sample	12/22/2014 12:15	LAO-SS-1-122214	10292874002	10292874	0.029		0.0017		0.00016		119		0.0057		0.013	J	0.00013		35.6		0.000026	U	0.000056	U	0.0053		0.04		NA		NA		NA		444		NA	
BTL Effluent Routine Sample	12/25/2014 13:30	LAO-SS-1-122514	10293057001	10293057	0.0053	J	0.0016		0.00015		109		0.0051		0.027	J	0.00016		33.4		0.000026	U	0.000056	U	0.0054		0.037		NA		NA		NA		411		NA	
BTL Effluent Routine Sample	12/29/2014 11:30	LAO-SS-1-122914	10293057002	10293057	0.0049	J	0.0017		0.00018		111	M1	0.0068		0.014	J	0.00011		35.8	M1	0.000026	U	0.000056	U	0.0051		0.047		NA		NA		NA		426		NA	
Average 2014 BTL Effluent From Routine Samples					0.0230		0.0036		0.00016		114		0.0096		0.048		0.00072		32.0		0.000028		0.000071		0.0042		0.040		36.6		719		6		417		0.49	
BTL Influent Routine Sample	01/06/2014 13:30	LAO-SS-2-010614	10254111003	10254111	0.1		0.027		0.019		141		0.51		3.5		0.011		36		0.00003	U	0.00005	U	0.015		5.3		NA		NA		NA		501		NA	
BTL Influent Routine Sample	01/13/2014 15:00	LAO-SS-2-011314	10254828003	10254828	0.17		0.033		0.019		137		0.75		4.9		0.012		39		0.000076	J	0.0001	BJ	0.014		4.9		NA		NA		NA		503		NA	
BTL Influent Routine Sample	01/20/2014 14:00	LAO-SS-2-012014	10255482003	10255482	0.08		0.022		0.019		144		0.44		3		0.0072		35.9		0.00003	U	0.00005	U	0.011		5.1		109		853		11		508		0.76	
BTL Influent Routine Sample	01/27/2014 13:40	LAO-SS-2-012714	10256165003	10256165	0.09		0.025		0.02		146		0.53		3.2		0.0099		37.9		0.00003	U	0.00005	U	0.013		5.9		NA		NA		NA		521		NA	
BTL Influent Routine Sample	02/03/2014 14:30	LAO-SS-2-020314	10256732003	10256732	0.1		0.026		0.018		137		0.5		3.3		0.009		36.6		0.00003	U	0.00016	BJ	0.014		5.2		NA		NA		NA		492		NA	
BTL Influent Routine Sample	02/10/2014 13:30	LAO-SS-2-021014	10257383003	10257383	1.2		0.14		0.028		140		3.2		23.7		0.055		36.8		0.00035		0.00032	J	0.022		7.6		NA		NA		NA		501		NA	
BTL Influent Routine Sample	02/17/2014 14:35	LAO-SS-2-021714	10257999003	10257999	0.16		0.026		0.021		134		0.65		3.8		0.0067		45.4		0.00003	U	0.000077	BJ	0.013		5.8		102		890		11		522		0.58	
BTL Influent Routine Sample	02/24/2014 14:30	LAO-SS-2-022414	10258670003	10258670	0.1		0.022		0.018		138		0.5		3		0.0056		44.3		0.00006	BJ	0.00014	BJ	0.013		5.3		NA		NA		NA		528		NA	
BTL Influent Routine Sample	03/03/2014 14:00	LAO-SS-2-030314	10259276003	10259276	0.097		0.025		0.018		120	M1	0.49		3.1		0.0052		39.7	M1	0.000032	BJ	0.000072	M1J	0.014		5.1	M1	NA		NA		NA		463		NA	
BTL Influent Routine Sample	03/10/2014 14:55	LAO-SS-2-031014	10259970003	10259970	0.3		0.029		0.017		99.5		0.62		3.5		0.01		30.9		0.000031	J	0.00005	U	0.0097		4.7		NA		NA		NA		376		NA	
BTL Influent Routine Sample	03/17/2014 12:52	LAO-SS-2-031714	10260584003	10260584	0.45		0.042		0.02		117		1.1		6.1		0.019		33.4		0.00028	B	0.00018	J	0.012		5.8		91.3		729		11	D8	429		0.8	
BTL Influent Routine Sample	03/24/2014 14:00	LAO-SS-2-032414	10261270003	10261270	0.082		0.015		0.019		120	M1	0.45	M1	2.2		0.0044		32.7	M1	0.000026	U	0.00014	J	0.011		5.8	M1	NA		NA		NA		434		NA	
BTL Influent Routine Sample	03/31/2014 12:21	LAO-SS-2-033114	10261909003	10261909	0.6	M1	0.055		0.024		134	M1	1.6	M1	10.6	M1	0.02		33	M1	0.000043	M1J	0.00034	J	0.015		6.3	M1	NA		NA		NA		471		NA	
BTL Influent Routine Sample	04/03/2014 12:18	LAO-SS-2 040714	10262594003	10262594	0.45		0.051		0.023		135		1.2		9		0.019		40.6		0.00009	J	0.00016	J	0.015		5.6		NA		NA		NA		505		NA	
BTL Influent Routine Sample	04/14/2014 11:10	LAO-SS-2-041414	10263484003	10263484	0.13		0.025		0.02		133		0.69		3.7		0.011		34.2		0.000066	J	0.000066	J	0.014		5.2		109		837		24		473		0.77	
BTL Influent Routine Sample	04/21/2014 10:57	LAO-SS-2-042114	10264241003	10264241	0.13		0.023		0.019		127		0.61		3.5		0.0086		31.7		0.00003	J	0.000056	U	0.013		5.3		NA		NA		NA		447		NA	
BTL Influent Routine Sample	04/28/2014 13:50	LAO-SS-2-042814	10265237003	10265237	0.078		0.018		0.02		135		0.47		2.5		0.0039		34		0.000026	U	0.000056	U	0.012		5.3		NA		NA		NA		477		NA	
BTL Influent Routine Sample	05/05/2014 11:57	LAO-SS-2-050514	10266033003	10266033	0.28		0.048		0.021		206		2		6.8		0.013		59.5		0.000026	U	0.0001	J	0.014		5.7		NA		NA		NA		760		NA	
BTL Influent Routine Sample	05/12/2014 13:27	LAO-SS-2-051214	10266930003	10266930	0.043		0.015		0.019		134		0.36		1.8		0.0028		35.1		0.000026	U	0.000056	U	0.012		5.3		112		681		9	J	479		1.2	
BTL Influent Routine Sample	05/19/2014 11:45	LAO-SS-2-051914	10267911003	10267911	0.15		0.032		0.02		133		0.76		4.2		0.0068		31.3		0.000026	U	0.000056	U	0.012		5.4		NA		NA		NA		461		NA	
BTL Influent Routine Sample	05/26/2014 09:40	LAO-SS-2-052614	10268921003	10268921	0.039		0.017		0.018		139		0.34		1.7		0.0023		33.3		0.000026	U	0.000056	U	0.012		4.8		NA		NA		NA		484		NA	
BTL Influent Routine Sample	06/02/2014 11:27	LAO-SS-2-060214	10269379003	10269379	0.065		0.021		0.018		137		0.43		2.2		0.0033		34.2		0.000026	U	0.000056	U	0.013		4.7		NA		NA		NA		483		NA	
BTL Influent Routine Sample	06/09/2014 11:57	LAO-SS-2-060914	10270192003	10270192	0.074		0.028		0.018		143		0.47		2.6		0.0032		35.9		0.000026	U	0.000056	U	0.013		5		NA		NA		NA		505		NA	
BTL Influent Routine Sample	06/16/2014 11:45	LAO-SS-2-061614	10270965003	10270965	0.089		0.03		0.017		137		0.46		2.8		0.0036		32.4		0.000026	U	0.000056	U	0.012		4.2		108		827		12		476		0.47	
BTL Influent Routine Sample	06/23/2014 11:45	LAO-SS-2-062314	10271825003	10271825	0.038		0.016		0.016		125		0.33		1.6		0.0018		32.1		0.000026	U	0.000056	U	0.011		4.4		NA		NA		NA		443		NA	
BTL Influent Routine Sample	06/30/2014 13:10	LAO-SS-2-063014	10272778003	10272778	0.16		0.042		0.019		135		0.72		4.1		0.007		32.6		0.000026	U	0.00007	J	0.013		5		NA		NA		NA		471		NA	
BTL Influent Routine Sample	07/07/2014 11:15	LAO-SS-2-070714	10273240003	10273240	0.049		0.023		0.014		124		0.37		1.8		0.0023		31.9		0.000026	U	0.000067	J	0.012		3.8		NA		NA		NA		442		NA	
BTL Influent Routine Sample	07/14/2014 11:25	LAO-SS-2-071414	10273983003	10273983	0.045		0.024		0.015		149		0.38		1.8		0.002		36.7		0.000026	U	0.000056	U	0.012		4.4		106		806		8	J	524		0.68	M1
BTL Influent Routine Sample	07/21/2014 10:56	LAO-SS-2-072114	10274756003	10274756	0.064		0.031		0.017		160		0.4		2.2		0.0024		40.3		0.000026	U	0.000056	U	0.013		4.4		NA		NA		NA		566		NA	
BTL Influent Routine Sample	07/28/2014 13:05	LAO-SS-2-072814	10275583003	10275583	0.031		0.027		0.015		133		0.31		1.4		0.0014		34.7		0.000026	U	0.000056	U	0.012		3.9		NA		NA		NA		475		NA	
BTL Influent Routine Sample	08/04/2014 10:52	LAO-SS-2-080414	10276503003	10276503	0.062		0.031		0.017		135		0.45		2.3		0.0026		34.3		0.000026	U	0.000056	U	0.011		4.6		NA		NA		NA		478		NA	
BTL Influent Routine Sample	08/11/2014 10:35	LAO-SS-2-081114	10277290003	10277290	0.048		0.028		0.015		141		0.38		1.9		0.002		34.2		0.000026	U	0.000056	U	0.011		4		NA		NA		NA		493		NA	
BTL Influent Routine Sample	08/18/2014 12:40	LAO-SS-2-081814	10278295003	10278295	0.079		0.038		0.02		132		0.54		2.3		0.0025		33.9		0.000026	U	0.000064	J	0.011		4.9		106		757		9	J	469		0.47	
BTL Influent Routine Sample	08/25/2014 12:20	LAO-SS-2-082514	10279209003	10279209	0.095		0.041		0.023		125		0.7		2.4		0.0036		31.2		0.000026	U	0.000056	U	0.0099		5.3		NA		NA		NA		441		NA	
BTL Influent Routine Sample	09/01/2014 09:20	LAO-SS-2-090114	10279969003	10279969	0.046		0.019		0.018		136		0.47		1.7		0.0018		35.1		0.000026	U	0.000056	U	0.01		5.4		NA		NA		NA		483		NA	
BTL Influent Routine Sample	09/08/2014 15:00	LAO-SS-2-090814	10280723003	10280723	0.032		0.017		0.02		136		0.39		1.5		0.0014		34.2		0.000026	U	0.000056	U	0.011		5.6		NA		NA		NA		480		NA	
BTL Influent Routine Sample	09/15/2014 12:40	LAO-SS-2-091514	10281591003	10281591	0.046		0.02		0.02		130		0.43		1.7		0.0018		34.4		0.000026	U	0.000056	U	0.011		5.5		116		801		16		467		0.78	M1
BTL Influent Routine Sample	09/22/2014 13:30	LAO-SS-2-092214	10282611003	10282611	0.097		0.04		0.025		132		0.74		3		0.0025		33		0.000026	U	0.000056	U	0.011		6.3		NA		NA		NA		464		NA	
BTL Influent Routine Sample	09/29/2014 11:45	LAO-SS-2-092914	10283373003	10283373	0.084		0.029		0.025		136		0.65		2.7		0.0027		34.6		0.000026	U	0.000056	U	0.01		7		NA		NA		NA		482		NA	
BTL Influent Routine Sample	10/06/2014 14:30	LAO-SS-2-100614	10284426003	10284426	0.036		0.017		0.021		138		0.39		1.5		0.0013		36.5		0.000026	U	0.000056	U	0.01		6.3		NA		NA		NA		495		NA	
BTL Influent Routine Sample	10/13/2014 12:40	LAO-SS-2 101314	10285156003	10285156	0.12		0.034		0.025		137		0.96		3		0.0032		37.3		0.000026	U	0.000056	U	0.011		5.8		120		787		11		496		0.72	
BTL Influent Routine Sample	10/20/2014 12:30	LAO-SS-2-102014	10285982003	10285982	0.11		0.025		0.028		140		0.6		2.8		0.003		36.9		0.000026	U	0.000056	U	0.015		6.4		NA		NA		NA		500		NA	
BTL Influent Routine Sample	10/27/2014 12:30	LAO-SS-2-102714	10286988003	10286988	0.041		0.012		0.022		128		0.4		1.8		0.0016		32.3		0.000026	U	0.000056	U	0.012		6.2		NA		NA		NA		452		NA	
BTL Influent Routine Sample	11/03/2014 11:50	LAO-SS-2-110314	10287627003	10287627	0.12		0.024	R1	0.021	R1	129	M1	0.76		3.8		0.0037	R1	36.2	M1	0.000026	U	0.000056	R1U	0.013	R1	6.1	M1	NA		NA		NA		472		NA	
BTL Influent Routine Sample	11/10/2014 11:30	LAO-SS-2-111014	10288403003	10288403	0.059		0.017		0.02		134		0.44		2.4		0.0022		34.6		0.000026	U	0.000056	U	0.012		5.4		NA		NA		NA		478		NA	
BTL Influent Routine Sample	11/17/2014 12:30	LAO-SS-2-111714	10289093003	10289093	0.19		0.031		0.025		139		0.9		5.5		0.0086		36.1		0.000026	U	0.000066	J	0.015		6.9		124		741		12		495		1	
BTL Influent Routine Sample	11/24/2014 14:55	LAO-SS-2-112414	10289895003	10289895	0.27		0.03		0.024		131		1		5.3		0.01		35.1		0.000026	U	0.000099	J	0.014		6.5		NA		NA		NA		472		NA	
BTL Influent Routine Sample	12/01/2014 12:20	LAO-SS-2-120114	10290312003	10290312	0.1		0.014		0.021		132		0.57		2.9		0.0048		35.8		0.000026	U	0.000056	U	0.015		6.4		NA		NA		NA		476		NA	
BTL Influent Routine Sample	12/08/2014 11:45	LAO-SS-2-120814	10291008003	10291008	0.097		0.013		0.021		132		0.49		2.4		0.0046		40.6		0.000026	U	0.000056	U	0.013		6.1		NA		NA		NA		496		NA	
BTL Influent Routine Sample	12/15/2014 11:30	LAO-SS-2-121514	10291754003	10291754	0.16		0.016		0.022		128		0.67		3.3		0.0066		35.1		0.000029	J	0.000077	J	0.015		6.3		117		800		30		465		1.8	
BTL Influent Routine Sample	12/22/2014 12:45	LAO-SS-2-122214	10292874003	10292874	0.15		0.017		0.023		144		0.62		3.2		0.0069		41.2		0.000026	U	0.000056	U	0.015		6.2		NA		NA		NA		529		NA	
BTL Influent Routine Sample	12/29/2014 12:00	LAO-SS-2-122914	10293057003	10293057	0.2		0.022		0.022		130		0.83		4.7		0.01		36.1		0.00005	BJ	0.00015	J	0.016		6.1		NA		NA		NA		473		NA	
Average 2014 BTL Influent From Routine Samples					0.148		0.029		0.020		135		0.67		3.6		0.0069		36.0		0.000042		0.000082		0.013		5.5		110		792		14		486		0.84	

Key:
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
U - Indicates the compound was analyzed for, but not detected.
D8 - The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
B - Analyte was detected in the associated method blank.
ES - The reported result is estimated because one or more of the constituent results qualified as such.
H1 - Analysis conducted outside the recognized method holding time.
H3 - Sample was received or analysis requested beyond the recognized method holding time.
H6 - Analysis initiated outside of the 15 minute EPA recommended holding time.
M1 - Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1 - RPD value was outside control limits.
E - Analyte concentration exceeded the calibration range. The reported result is estimated.

Appendix C-3 is included as a separate PDF file.

APPENDIX C-3

COMPLETE BENCH-SCALE LABORATORY ANALYTICAL REPORTS

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

APPENDIX D

TE13 HD FILTER EFFICIENCY CALCULATIONS AND BACKUP DATA

TECHNICAL MEMORANDUM 3: BPSOU TECHNOLOGY ELEMENTS EFFICIENCY EVALUATION

Metals Fraction by Sediment - June 16 and July 15, 2014 Events

Location	Date	Gradation	Sediment (g)	Copper per Sediment (mg/kg)	Copper per Fraction (g)	Percent of Total by Fraction	Perlite/MetalRx 5 PSD, CO-SIL-106			
							Removal by Fraction	Sum of Fractional Removal	Total Recoverable Copper Removal	Dissolved Copper Removal
AR-MH-1	6/16/14 11:28	<0.002 mm (clay)	0.5591	495	0.2768	55.1%	0.0%			
AR-MH-1	6/16/14 11:28	0.002-0.02 mm (fine silt)	0.0339	1670	0.0566	11.3%	0.0%			
AR-MH-1	6/16/14 11:28	0.02-0.05 mm (medium silt)	0.1781	394	0.0702	14.0%	11.7%	29.1%	16.4%	12.7%
AR-MH-1	6/16/14 11:28	0.05-0.063 mm (course silt)	0.0143	1010	0.0144	2.9%	2.6%			
AR-MH-1	6/16/14 11:28	0.063-1 mm (Fine Sand)	0.1383	608	0.0841	16.7%	14.9%			
AR-MH-1	6/16/14 11:28	1-2 mm (Coarse Sand)	0.0001	0	0.0000	0.0%	0.0%			
TX-HD-1	6/16/14 12:00	<0.002 mm (clay)	0.0676	1530	0.1034	9.4%	0.0%			
TX-HD-1	6/16/14 12:00	0.002-0.02 mm (fine silt)	0.2356	907	0.2137	19.5%	0.0%			
TX-HD-1	6/16/14 12:00	0.02-0.05 mm (medium silt)	0.3704	932	0.3452	31.4%	26.2%	56.4%	53.5%	2.9%
TX-HD-1	6/16/14 12:00	0.05-0.063 mm (course silt)	0.0413	714	0.0295	2.7%	2.4%			
TX-HD-1	6/16/14 12:00	0.063-1 mm (Fine Sand)	0.817	420	0.3431	31.2%	27.8%			
TX-HD-1	6/16/14 12:00	1-2 mm (Coarse Sand)	0.2883	219	0.0631	5.7%	0.0%			
WA-HD-1	6/16/14 13:51	<0.002 mm (clay)	10.03	213	2.1364	73.9%	0.0%			
WA-HD-1	6/16/14 13:51	0.002-0.02 mm (fine silt)	0.2018	608	0.1227	4.2%	0.0%			
WA-HD-1	6/16/14 13:51	0.02-0.05 mm (medium silt)	0.4035	593	0.2393	8.3%	6.9%	14.9%	10.9%	4.0%
WA-HD-1	6/16/14 13:51	0.05-0.063 mm (course silt)	0.081	1310	0.1061	3.7%	3.3%			
WA-HD-1	6/16/14 13:51	0.063-1 mm (Fine Sand)	0.5377	283	0.1522	5.3%	4.7%			
WA-HD-1	6/16/14 13:51	1-2 mm (Coarse Sand)	0.0387	3450	0.1335	4.6%	0.0%			
BG-CLV-01	6/17/14 10:06	<0.002 mm (clay)	2.109	187	0.3944	21.4%	0.0%			
BG-CLV-01	6/17/14 10:06	0.002-0.02 mm (fine silt)	0.0491	837	0.0411	2.2%	0.0%			
BG-CLV-01	6/17/14 10:06	0.02-0.05 mm (medium silt)	0.5884	1050	0.6178	33.5%	28.0%	66.1%	56.8%	9.3%
BG-CLV-01	6/17/14 10:06	0.05-0.063 mm (course silt)	0.5235	926	0.4848	26.3%	23.4%			
BG-CLV-01	6/17/14 10:06	0.063-1 mm (Fine Sand)	0.3078	993	0.3056	16.6%	14.8%			
BG-CLV-01	6/17/14 10:06	1-2 mm (Coarse Sand)	0	1400	0	0.0%	0.0%			
BG-CH-B3	7/15/14 1:29	<0.002 mm (clay)	9.826	236	2.318936	44.4%	0.0%			
BG-CH-B3	7/15/14 1:29	0.002-0.02 mm (fine silt)	7.88	202	1.59176	30.5%	0.0%			
BG-CH-B3	7/15/14 1:29	0.02-0.05 mm (medium silt)	2.32	58.8	0.136416	2.6%	2.2%	22.0%	21.5%	0.5%
BG-CH-B3	7/15/14 1:29	0.05-0.063 mm (course silt)	4.438	108	0.479304	9.2%	8.2%			
BG-CH-B3	7/15/14 1:29	0.063-1 mm (Fine Sand)	4.265	160	0.6824	13.1%	11.6%			
BG-CH-B3	7/15/14 1:29	1-2 mm (Coarse Sand)	0.0314	488	0.0153232	0.3%	0.0%			

Location	Date	Copper (mg/L)	Particulate Copper (mg/L)	Ratio of Particulate to Total Recoverable	Ratio of Dissolved to Total Recoverable
EX-AR-MH-1 (TR)	6/16/14 11:28	0.0615	0.0347	56.4%	43.6%
EX-AR-MH-1 (DIS)	6/16/14 11:28	0.0268			
EX-TX-HD-1 (TR)	6/16/14 12:00	0.706	0.6696	94.8%	5.2%
EX-TX-HD-1 (DIS)	6/16/14 12:00	0.0364			
EX-WA-HD-1 (TR)	6/16/14 13:51	0.325	0.2384	73.4%	26.6%
EX-WA-HD-1 (DIS)	6/16/14 13:51	0.0866			
EX-BG-CLV-01 (TR)	6/17/14 10:06	0.0479	0.04115	85.9%	14.1%
EX-BG-CLV-01 (DIS)	6/17/14 10:06	0.00675			
EX-BG-CH-B3 (TR)	7/15/14 1:29	0.256	0.25026	97.8%	2.2%
EX-BG-CH-B3 (DIS)	7/15/14 1:29	0.00574			

Perlite/Metal Rx	Summary Statistics	Total Recoverable Copper Removal	Dissolved Copper Removal
	Minimum	10.9%	0.5%
	Maximum	56.8%	12.7%
	Mean	31.8%	5.9%
	Standard Deviation	21.7%	5.0%

Perlite/CSF 6 PSD, CO-SIL-106			
Removal by Fraction	Sum of Fractional Removal	Total Recoverable Copper Removal	Dissolved Copper Removal
0.0%			
0.0%			
10.5%	26.6%	15.0%	11.6%
2.4%			
13.7%			
0.0%			
0.0%			
0.0%			
23.6%	56.2%	53.3%	2.9%
2.2%			
25.6%			
4.7%			
0.0%			
0.0%			
6.2%	17.3%	12.7%	4.6%
3.0%			
4.3%			
3.8%			
0.0%			
0.0%			
25.2%	60.3%	51.8%	8.5%
21.6%			
13.6%			
0.0%			
0.0%			
0.0%			
2.0%	20.4%	20.0%	0.5%
7.5%			
10.7%			
0.2%			

CSF 6 PSD, Silt Loam			
Removal by Fraction	Sum of Fractional Removal	Total Recoverable Copper Removal	Dissolved Copper Removal
0.0%			
0.0%			
8.7%	22.1%	12.4%	9.6%
2.0%			
11.4%			
0.0%			
0.0%			
0.0%			
19.6%	46.6%	44.2%	2.4%
1.8%			
21.2%			
3.9%			
0.0%			
0.0%			
5.2%	14.4%	10.5%	3.8%
2.5%			
3.6%			
3.1%			
0.0%			
0.0%			
20.9%	50.0%	43.0%	7.1%
17.9%			
11.3%			
0.0%			
0.0%			
0.0%			
1.6%	16.9%	16.6%	0.4%
6.2%			
8.9%			
0.2%			

Perlite/CSF	Summary Statistics	Total Recoverable Copper Removal	Dissolved Copper Removal
	Minimum	12.7%	0.5%
	Maximum	53.3%	11.6%
	Mean	30.6%	5.6%
	Standard Deviation	20.3%	4.4%

CSF	Summary Statistics	Total Recoverable Copper Removal	Dissolved Copper Removal
	Minimum	10.5%	0.4%
	Maximum	44.2%	9.6%
	Mean	25.3%	4.7%
	Standard Deviation	16.8%	3.7%

Metals Fraction by Sediment - August 12, 2014 Event

Location	Date	Gradation	Sediment (g)	Type	Copper per Sediment (mg/kg)	Copper per Fraction (g)	Percent of Total by Fraction	Perlite/MetalRx 5 PSD, CO-SIL-106			
								Removal by Fraction	Sum of Fractional Removal	Total Recoverable Copper Removal	Dissolved Copper Removal
EX-AR-MH-1	8/12/14 22:10	<0.002 mm (clay)	1.71	Total	1090	1.8639	28.1%	0.0%			
EX-AR-MH-1	8/12/14 22:10	0.002-0.02 mm (fine silt)	2.834	Total	864	2.4486	36.9%	0.0%			
EX-AR-MH-1	8/12/14 22:10	0.02-0.05 mm (medium silt)	0.9881	Total	1060	1.0474	15.8%	13.2%	30.2%	23.8%	6.4%
EX-AR-MH-1	8/12/14 22:10	0.05-0.063 mm (course silt)	0.3154	Total	632	0.1993	3.0%	2.7%			
EX-AR-MH-1	8/12/14 22:10	0.063-1 mm (Fine Sand)	1.978	Total	460	0.9099	13.7%	12.2%			
EX-AR-MH-1	8/12/14 22:10	1-2 mm (Coarse Sand)	0.5344	Total	301	0.1609	2.4%	2.2%			
EX-WA-HD-1	8/12/14 21:14	<0.002 mm (clay)	2.139	Total	1980	4.2352	12.2%	0.0%			
EX-WA-HD-1	8/12/14 21:14	0.002-0.02 mm (fine silt)	19.13	Total	967	18.4987	53.2%	0.0%			
EX-WA-HD-1	8/12/14 21:14	0.02-0.05 mm (medium silt)	9.85	Total	853	8.4021	24.2%	20.2%	29.5%	28.5%	0.9%
EX-WA-HD-1	8/12/14 21:14	0.05-0.063 mm (course silt)	1.422	Total	675	0.9599	2.8%	2.5%			
EX-WA-HD-1	8/12/14 21:14	0.063-1 mm (Fine Sand)	5.848	Total	446	2.6082	7.5%	6.7%			
EX-WA-HD-1	8/12/14 21:14	1-2 mm (Coarse Sand)	0.1025	Total	669	0.0686	0.2%	0.2%			
EX-TX-HD-1	8/12/14 21:31	<0.002 mm (clay)	1.714	Total	1690	2.8967	17.1%	0.0%			
EX-TX-HD-1	8/12/14 21:31	0.002-0.02 mm (fine silt)	7.749	Total	1630	12.6309	74.5%	0.0%			
EX-TX-HD-1	8/12/14 21:31	0.02-0.05 mm (medium silt)	0.5051	Total	1300	0.6566	3.9%	3.2%	7.3%	6.6%	0.7%
EX-TX-HD-1	8/12/14 21:31	0.05-0.063 mm (course silt)	0.2114	Total	1450	0.3065	1.8%	1.6%			
EX-TX-HD-1	8/12/14 21:31	0.063-1 mm (Fine Sand)	0.4664	Total	654	0.3050	1.8%	1.6%			
EX-TX-HD-1	8/12/14 21:31	1-2 mm (Coarse Sand)	0.1892	Total	884	0.1673	1.0%	0.9%			
EX-BG-CLV-1	8/12/14 21:09	<0.002 mm (clay)	2.48	Total	750	1.8600	7.7%	0.0%			
EX-BG-CLV-1	8/12/14 21:09	0.002-0.02 mm (fine silt)	14.03	Total	732	10.2700	42.8%	0.0%			
EX-BG-CLV-1	8/12/14 21:09	0.02-0.05 mm (medium silt)	4.063	Total	577	2.3444	9.8%	8.1%	43.5%	39.4%	4.1%
EX-BG-CLV-1	8/12/14 21:09	0.05-0.063 mm (course silt)	2.081	Total	950	1.9770	8.2%	7.3%			
EX-BG-CLV-1	8/12/14 21:09	0.063-1 mm (Fine Sand)	9.146	Total	798	7.2985	30.4%	27.0%			
EX-BG-CLV-1	8/12/14 21:09	1-2 mm (Coarse Sand)	0.367	Total	735	0.2697	1.1%	1.0%			

Location	Date	Type	Copper (mg/L)	Particulate Copper (mg/L)	Ratio of Particulate to Total Recoverable	Ratio of Dissolved to Total Recoverable
EX-AR-MH-1	8/12/14 22:10	Total	0.38	0.2997	78.9%	21.1%
EX-AR-MH-1	8/12/14 22:10	Dissolved	0.0803			
EX-WA-HD-1	8/12/14 21:14	Total	0.863	0.836	96.9%	3.1%
EX-WA-HD-1	8/12/14 21:14	Dissolved	0.027			
EX-TX-HD-1	8/12/14 21:31	Total	1.33	1.198	90.1%	9.9%
EX-TX-HD-1	8/12/14 21:31	Dissolved	0.132			
EX-BG-CLV-1	8/12/14 21:09	Total	0.227	0.2058	90.7%	9.3%
EX-BG-CLV-1	8/12/14 21:09	Dissolved	0.0212			

Perlite/Metal Rx	Summary Statistics	Total Recoverable Copper Removal	Dissolved Copper Removal
	Minimum	6.6%	0.7%
	Maximum	39.4%	6.4%
	Mean	24.6%	3.0%
	Standard Deviation	13.7%	2.7%

Perlite/CSF 6 PSD, CO-SIL-106			
Removal by Fraction	Sum of Fractional Removal	Total Recoverable Copper Removal	Dissolved Copper Removal
0.0%			
0.0%			
11.9%	27.6%	21.8%	5.8%
2.5%			
11.3%			
2.0%			
0.0%			
0.0%			
18.2%	26.7%	25.9%	0.8%
2.3%			
6.2%			
0.2%			
0.0%			
0.0%			
2.9%	6.7%	6.0%	0.7%
1.5%			
1.5%			
0.8%			
0.0%			
0.0%			
7.3%	39.9%	36.2%	3.7%
6.7%			
24.9%			
0.9%			

CSF 6 PSD, Silt Loam			
Removal by Fraction	Sum of Fractional Removal	Total Recoverable Copper Removal	Dissolved Copper Removal
0.0%			
0.0%			
9.8%	22.9%	18.0%	4.8%
2.0%			
9.3%			
1.6%			
0.0%			
0.0%			
15.1%	22.2%	21.5%	0.7%
1.9%			
5.1%			
0.1%			
0.0%			
0.0%			
2.4%	5.5%	5.0%	0.5%
1.2%			
1.2%			
0.7%			
0.0%			
0.0%			
6.1%	27.5%	24.9%	2.6%
0.0%			
20.7%			
0.8%			

Perlite/CSF	Summary Statistics	Total Recoverable Copper Removal	Dissolved Copper Removal
	Minimum	6.0%	0.7%
	Maximum	36.2%	5.8%
	Mean	22.5%	2.8%
	Standard Deviation	12.5%	2.5%

CSF	Summary Statistics	Total Recoverable Copper Removal	Dissolved Copper Removal
	Minimum	5.0%	0.5%
	Maximum	24.9%	4.8%
	Mean	17.4%	2.2%
	Standard Deviation	8.7%	2.0%

Contech 18" StormFilter MetalRx Media Time to Occlusion

Assumptions:

Each Canister will treat 1 gpm of influent flow per ft2 of media surface area.		
h (in)	**Q (gpm)**	**Sediment Capacity per Cartridge (lbs)**
18	7.5	36

Flow Treated by Drainage:

Drainage	Q (gpm)	Cartridges Required	Pounds Sediment to Occlusion	Percent Sediment Reporting to Filter Media
AR-MH-1	400	53.3	1944	40%
WA-HD-1	400	53.3	1944	40%
TX-HD-1	800	106.7	3852	40%
BG-CLV-1	800	106.7	3852	40%
BG-CH-B3	400	53.3	1944	40%

Sediment less than 1mm:

Location	Date	Gradation	Sediment (g)	Percent 1 mm or less
AR-MH-1	6/16/14 11:28	<0.002 mm (clay)	0.5591	99.99%
AR-MH-1	6/16/14 11:28	0.002-0.02 mm (fine silt)	0.0339	
AR-MH-1	6/16/14 11:28	0.02-0.05 mm (medium silt)	0.1781	
AR-MH-1	6/16/14 11:28	0.05-0.063 mm (course silt)	0.0143	
AR-MH-1	6/16/14 11:28	0.063-1 mm (Fine Sand)	0.1383	
AR-MH-1	6/16/14 11:28	1-2 mm (Coarse Sand)	0.0001	
TX-HD-1	6/16/14 12:00	<0.002 mm (clay)	0.0676	84.16%
TX-HD-1	6/16/14 12:00	0.002-0.02 mm (fine silt)	0.2356	
TX-HD-1	6/16/14 12:00	0.02-0.05 mm (medium silt)	0.3704	
TX-HD-1	6/16/14 12:00	0.05-0.063 mm (course silt)	0.0413	
TX-HD-1	6/16/14 12:00	0.063-1 mm (Fine Sand)	0.817	
TX-HD-1	6/16/14 12:00	1-2 mm (Coarse Sand)	0.2883	
WA-HD-1	6/16/14 13:51	<0.002 mm (clay)	10.03	99.66%
WA-HD-1	6/16/14 13:51	0.002-0.02 mm (fine silt)	0.2018	
WA-HD-1	6/16/14 13:51	0.02-0.05 mm (medium silt)	0.4035	
WA-HD-1	6/16/14 13:51	0.05-0.063 mm (course silt)	0.081	
WA-HD-1	6/16/14 13:51	0.063-1 mm (Fine Sand)	0.5377	
WA-HD-1	6/16/14 13:51	1-2 mm (Coarse Sand)	0.0387	
BG-CLV-01	6/17/14 10:06	<0.002 mm (clay)	2.109	100.00%
BG-CLV-01	6/17/14 10:06	0.002-0.02 mm (fine silt)	0.0491	
BG-CLV-01	6/17/14 10:06	0.02-0.05 mm (medium silt)	0.5884	
BG-CLV-01	6/17/14 10:06	0.05-0.063 mm (course silt)	0.5235	
BG-CLV-01	6/17/14 10:06	0.063-1 mm (Fine Sand)	0.3078	
BG-CLV-01	6/17/14 10:06	1-2 mm (Coarse Sand)	0	
EX-BG-CH-B3	7/15/14 1:29	<0.002 mm (clay)	9.826	99.89%
EX-BG-CH-B3	7/15/14 1:29	0.002-0.02 mm (fine silt)	7.88	
EX-BG-CH-B3	7/15/14 1:29	0.02-0.05 mm (medium silt)	2.32	
EX-BG-CH-B3	7/15/14 1:29	0.05-0.063 mm (course silt)	4.438	
EX-BG-CH-B3	7/15/14 1:29	0.063-1 mm (Fine Sand)	4.265	
EX-BG-CH-B3	7/15/14 1:29	1-2 mm (Coarse Sand)	0.0314	

Time to Occlusion:

Location	Event	Type	Result	Unit	Pounds Sediment per Gallon Influent	18" Cartridges, 1 gpm/ft^2 Time to Occlusion (min)	Time to Occlusion (hours)	Time to Occlusion (days)	Average by Drainage (days)
EX-AR-MH-1	6/16/14 11:28	TSS	43	mg/L	0.00036	13546	225.8	9.4	4.2
EX-AR-MH-1	7/23/14 18:25	TSS	196	mg/L	0.00164	2972	49.5	2.1	
EX-AR-MH-1	8/12/14 22:10	TSS	366	mg/L	0.00305	1591	26.5	1.1	
EX-WA-HD-1	6/16/14 13:51	TSS	160	mg/L	0.00134	3653	60.9	2.5	1.1
EX-WA-HD-1	7/23/14 19:11	TSS	1586	mg/L	0.01323	368	6.1	0.3	
EX-WA-HD-1	8/12/14 21:14	TSS	938	mg/L	0.00783	623	10.4	0.4	
EX-TX-HD-1	6/16/14 12:00	TSS	1000	mg/L	0.00834	686	11.4	0.5	0.6
EX-TX-HD-1	8/12/14 21:31	TSS	728	mg/L	0.00607	942	15.7	0.7	
EX-BG-CLV-1	6/17/14 10:06	TSS	58	mg/L	0.00048	9949	165.8	6.9	2.7
EX-BG-CLV-1	7/23/14 18:26	TSS	1222	mg/L	0.01020	472	7.9	0.3	
EX-BG-CLV-1	8/12/14 21:09	TSS	416	mg/L	0.00347	1387	23.1	1.0	
EX-BG-CH-B3	7/15/14 1:29	TSS	692	mg/L	0.00577	843	14.0	0.6	0.6
							Butte Hill Average:	**2.1**	

Note: Calculation does not consider potential impact of any accumulated sediment within the bottom of the concrete vault housing.

APPENDIX E

CONTECH PROJECT CORRESPONDENCE

TECHNICAL MEMORANDUM 3: BPSOU TECHNOLOGY ELEMENTS EFFICIENCY EVALUATION

From:	Pedrick, John
To:	Josh Bryson
Cc:	Mok, Geoff
Subject:	RE: Synopsis Update
Date:	Tuesday, January 27, 2015 6:19:34 PM
Attachments:	image007.png image008.png image009.png CSF Leaf Media Background & Summary of Studies.pdf SCS106 Batch #001 Distribution.pdf SCS106 Batch #001 PSD.xls

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Josh,

With respect to the water quality data provided TSS, dissolved Cu, and dissolved Zn concentrations observed downstream of the HDS system being evaluated are generally greater than those typically observed in storm water. The overall system design would likely require additional solids treatment prior to treatment using the MetalRx media to ensure reasonable maintenance intervals. As per you request I am providing background on the MetalRx media, associated solids removal data, and dissolved metals removal data.

Media Background

The CSF leaf compost media has been in use as a proprietary stormwater filtration media throughout the United States since 1992. Pelletized deciduous leaf compost (CSF leaf media) has many characteristics that lend itself well to the filtration of stormwater runoff. CSF leaf media has a high hydraulic capacity with high organic content properties (i.e. carbon). As with most types of compost, the organic matter does also contain residual nitrates and ortho-phosphorus that should be evaluated prior to discharge to sensitive basins.

There are three properties that make the deciduous leaf compost an excellent medium for pollutant removal: chelation, cation exchange, and adsorption. The mediabound ions that provide cation exchange capacity are calcium (Ca), magnesium (Mg), potassium (K) and sodium (Na) with calcium and magnesium being the primary exchange ions due to their abundance within the media matrix. The cation exchange capacity (CEC) in the CSF leaf media varies with a specification that is greater than 50 milliequivalents (meq) per 100-grams, although CECs in excess of 90 have been measured.

The CSF leaf media gradation has undergone some changes but the fundamental material, hence chemical and physical properties remain unchanged. With respect to the current project, the MetalRx gradation(#14 to #8 screen) is recommended.

Solids Performance

CONTECH has been investigating various particle size distributions (PSDs) for BMP acceptance or verification for various agencies: Washington State Department of Ecology (Ecology), New Jersey Corporation for Advanced Technology (NJ CAT), New Jersey State Department of Environmental Protection (NJ DEP), City of Portland, OR Bureau of Environmental Services (BES).

Five different PSDs are presented in Table 1. These particle sizes consist of natural soils (sandy loam and silt loam), manufactured sediment (SIL-CO-SIL 106), and two protocols for evaluating stormwater (APWA and City of Portland BES). The StormFilter was tested with the natural soils and SIL-CO-SIL sediments (finer distribution than the APWA or BES protocols). PSD testing was predominantly conducted using simulated stormwater in a TSS concentration range between approximately 0 – 350 mg/L. Table 1 has a summary of various PSDs that have been investigated. Table 2 contains the TSS removal performance with these different sediments.

Table 1. Sediment Particle Size Distributions

Particle Size (microns)	Percent by mass (approximate)				
	Sandy loam [a]	Silt loam [a]	SIL-CO-SIL 106 [b]	APWA 1999 Protocol [c]	Portland BES [c]
500 – 1000	5.0	5.0	0	20.0	10.0
250 – 500	5.0	2.5	0	10.0	10.0
100 – 250	30.0	2.5	0	35.0	25.0
50 –100	15.0	5.0	20.0	10.0	25.0
2 – 50	40.0	65.0	80.0	25.0	30.0
1 – 2	5.0	20.0	0.0	0	0

[a] CONTECH tested Oregon silt and sandy loams for New Jersey Corporation for Advanced Technology verification of TSS performance claims.

[b] CONTECH tested SIL-CO-SIL 106 for Washington State Department of Ecology per the Technology Assessment Protocol – Ecology (2001).

[c] Hypothetical particle size distributions from these testing protocols. Particle sizes were presented in a range available in Appendix A; the table represents the least conservative (coarser) approximate particle size range.

Table 2. TSS removal using differing particle size distributions

Media Type	Cartridge Flow Rate (gpm)	Percent Removal (%)			PSD Effectiveness
		Sandy loam [a]	Silt loam [a]	SIL-CO-SIL 106 [a]	SIL-CO-SIL 106 (lowest micron)
Standard Perlite	15	77 - 80		72 – 78	10
Standard Perlite	7.5			78 – 83	7
Coarse Fine Perlite	15				
Coarse Fine Perlite	7.5		68 – 75	79 – 82	7
Fine Perlite	15			73 – 78	10
Fine Perlite	7.5			85 – 88	6
CSF® leaf [b]	15		68 – 79		
Coarse Perlite/Zeolite [c]	15		63 – 84		
ZPG™	15			80 – 82	7
ZPG™	7.5			86 – 89	5
PhosphoSorb™	15			80 – 84	7
PhosphoSorb™	7.5			87 – 89	6
Perlite/CSF® leaf	7.5			82 – 86	6
Perlite/Metal Rx™	7.5			89 – 92	5
Granular Activated Carbon	7.5			89 – 92	5

[a] Linear regression was used in the data analysis, the table presents the upper and lower 95% confidence limits. Data was collected in the CONTECH laboratory using simulated stormwater for TSS concentrations between 0 – 350 mg/L. Silt and sandy loam performance data was NJCAT-verified.

[b] Performance of the CSF leaf media was tested using both field and laboratory investigations. Laboratory studies used a Palatine loam sediment. Field data is from the Pacific Northwest.

[c] Performance of the coarse perlite / coarse zeolite media was tested using a Palatine loam sediment. Reported in Total Suspended Solids Removal using StormFilter Technology.

Dissolved Metals Performance

Metals are measured as both total metals and soluble metals. Total metals are the sum of dissolved metals and those metals associated with particulates. Soluble metals are commonly defined as those metals that pass through a 0.45 micron filter. Frequently the soluble metals are in a cationic form in that they posses a net positive charge. However, sometimes the charge of the soluble metal has been satisfied in that it could be associated with sub-micron particles such as ligands or colloids. In this event, the metal may not have a net positive charge. Additional data would likely be required to verify the later for this particular project.

Cation exchange is the exchange of a cation (positively charged atom) for another cation. The process involves the displacement of an atom within the media matrix by an atom within the water column. The displacement occurs if the incoming atom's affinity for the exchange site is higher than that of the current occupying atom. In general, the physically smaller the ion (when hydrated) and the greater the positive charge the more tightly it will be held by the media.

Predictions can be made using a periodic table of elements for commonly found metals in stormwater runoff. Staying within the same row of the table and proceeding left to right produces an increasing affinity for cation exchange. This trend is promoted due to the metal atom remaining in the same valence state (charge) while the overall

diameter of the atom decreases. Since the diameter decreases, the "apparent charge" of the atom increases, thus producing the driving mechanism for cation exchange. For most purposes the following affinity series is true:

$$Al^{3+} > H^{+} > Zn^{2+} > Cu^{2+} > Ni^{2+} > Fe^{2+} > Cr^{2+} > Ca^{2+} > Mg^{2+} > K^{+} > Na^{+}$$

Over the course of an 11-year period (2000-2010) stormwater runoff from multiple facilities (industrial and commercial) was evaluated using MetalRx at a specific flow rate of 1 gpm/ft2 in the Pacific Northwest. The data were analyzed to quantify the capabilities of the StormFilter with MetalRx media at a specific flow rate of 1 gpm/ft2 for removing suspended solids and dissolved metals in meeting Washington State Department of Ecology's (Ecology's) performance criteria.

Dissolved copper and dissolved zinc removal efficiencies clearly met performance goals of 30% for dissolved copper removal and 60% for dissolved zinc removal. In addition, using the bootstrap method for analysis of dissolved copper and dissolved zinc removal efficiencies demonstrated that the lower 95% confidence limit for both satisfy the TAPE 2011 performance objective

A total of 18 dissolved copper data points were analyzed the mean and median dissolved copper influent concentrations were 10 µg/L and 9.05 µg/L, and the mean and median effluent concentrations were 5.9 µg/L and 6.45 µg/L, respectively. The mean and median discrete removal efficiencies were 39% and 37%, respectively.

A total of 17 dissolved zinc data points were analyzed. The dissolved zinc influent concentrations ranged from 18.8 µg/L to 59.5 µg/L. The mean and median dissolved zinc influent concentrations were 43 µg/L and 44 µg/L respectively, and the mean and median effluent concentrations were both 14 µg/L. The mean and median discrete removal efficiencies were 66% and 70%, respectively.

Feel free to call or e-mail if you have any additional questions or concerns.

Regards,

John H. Pedrick, CPSWQ
Project Manager

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From: Pedrick, John
To: Josh Bryson
Subject: RE: Synopsis Update
Date: Friday, February 06, 2015 6:12:05 PM
Attachments: image005.png
image006.png
image002.png
Site 1. Aeroground Final Report Draft.pdf

Josh,

The attached report provides both Total and Dissolved metals removal for your reference. Feel free to call or e-mail if you have any questions.

Table 3. Aggregate loading reduction results.

Medium	Total Recoverable Zn (%)	Total Recoverable Cu (%)	Dissolved Zn (%)	Dissolved Cu (%)
MS	76%	28%	76%	28%
XFC	58%	19%	57%	19%
2-stage MRX	84%	37%	85%	37%

Cheers,

John H. Pedrick, CPSWQ
Project Manager

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From: Josh Bryson [mailto:jbryson@pioneer-technical.com]
Sent: Wednesday, January 28, 2015 2:38 PM
To: Pedrick, John
Cc: Mok, Geoff; mborduin@pioneer-technical.com; cbailey@pioneer-technical.com
Subject: RE: Synopsis Update

Hey John,

A couple of questions for you in regard to application of some of our assumptions we have been using.

Our assumptions for ongoing negotiations for the TI waiver are:

1. We'll be using MetalRx (only) within the storm filter cartridges, and
2. The 18" cartridges will be used at a flowrate of 7.5 gpm,

3. The current conditions of the storm water (TSS, metals concentrations, pH, etc.) will remain representative of future inflow conditions.

In regard to your findings:

1. In table 2, you have a hybrid perlite/MetalRx cartridge at a flow rate of 7.5 gpm removing 89-92% of the silica sand. I'm guessing this is not able to directly predict sole performance of a MetalRx cartridge (not hybrid)?
2. Also in Table 2, you show a CSF leaf media at 15 gpm removing 68-79% of the silt loam. Could it be assumed, that due to the finer nature of the MetalRx, that that Metal Rx would, at a minimum, reach 68-79% removal of the same silt loam gradation?
3. In your later text conclusions you reference *Over the course of an 11-year period (2000-2010) stormwater runoff from multiple facilities (industrial and commercial) was evaluated using MetalRx at a specific flow rate of 1 gpm/ft2 in the Pacific Northwest.*
    a. How will the performance efficiencies be impacted by translation from 1 gpm/ft2 to our assumptive flow rate of 7.5 gpm? To me the 7.5 gpm is representative of an 18-inch canister, but that flow is still distributed at 1gpm/ft2 of that same canister. Therefore it doesn't matter how many gpm you treat, so long as you remain at 1gpm/ft2, you are still at 37-39% removal for dissolved copper. Same applies to dissolved zinc.
4. Based on the gradations we provided to you, and the fractionation of metals to those specific particle size ranges, can you predict TR removal from the same studies which you derived the 37-39% removal efficiencies for Dis. Cu?

Thanks for the clarification,

Josh Bryson | Senior Engineer

Pioneer Technical Services Inc. | 1101 South Montana Street | Butte, MT 59701
Cell: 406.565.7164 jbryson@pioneer-technical.com

From: Pedrick, John [mailto:JPedrick@conteches.com]
Sent: Tuesday, January 27, 2015 6:19 PM
To: Josh Bryson
Cc: Mok, Geoff
Subject: RE: Synopsis Update

Josh,

With respect to the water quality data provided TSS, dissolved Cu, and dissolved Zn concentrations observed downstream of the HDS system being evaluated are generally greater than those typically observed in storm water. The overall system design would likely require additional solids treatment prior to treatment using the MetalRx media to ensure reasonable maintenance intervals. As per you request I am providing background on the MetalRx media, associated solids removal data, and dissolved metals removal data.

From:	Pedrick, John
To:	Josh Bryson
Cc:	Darcy, Sean
Subject:	RE: More Clarifications for you.
Date:	Saturday, February 07, 2015 2:08:58 AM
Attachments:	SCS106 Batch #001 Distribution.pdf

Josh,

The PSD of the influent would be helpful with respect to correlating TSS removal efficiency results. I'd recommend plotting the influent PSD results and comparing them to the SCS106 testing sediment. The overall capacity of the filter cartridges is 25-50 pounds of sediment per cartridge depending on the height of the cartridge used. Once a cartridge becomes occluded the system will go into bypass. When the cartridges become occluded, I'd expect some settling in the vault but both the solids and total metals removal efficiencies would be significantly reduced. I'm out next week but feel free to follow up with Sean Darcy while I'm out if you have any additional questions.

Regards,

John H. Pedrick, CPSWQ
Project Manager

Contech Engineered Solutions LLC
11815 NE Glenn Widing Drive| Portland, OR 97220
Off: 503.258.3134 Mob: 503.504.4254 Fax: 800.561.1271
jpedrick@conteches.com
www.ContechES.com

From: Josh Bryson [mailto:jbryson@pioneer-technical.com]
Sent: Tuesday, February 03, 2015 10:00 AM
To: Pedrick, John
Cc: Mok, Geoff
Subject: More Clarifications for you.

Hey John,

I went back and looked as our TI assumptions matrix for evaluation of the efficiency of the MetalRx and CSF leaf media products. Here is a list of those assumptions that may assist you in development of your total recoverable efficiency predictions:

- The projected %TSS removal efficiency, in consideration of our gradation and metals fractionation data provided to Contech, should be used to predict the metals removal efficiency.
    - How do we correlate Contech's available sediment/surrogate sediment removal efficiencies to our site specific data?

- The overall capacity of the media/filters for TSS. Otherwise, is there some critical loading point of TSS where the StormFilter technology, with MetalRx or CSF media (18" canisters at 1gpm/fr^2), becomes occluded or otherwise ineffective?
    - The model storm and associated load subjected to the filters will be from a 5-year, 24 hour event.

- Is there a maximum, recommended TSS load that does not require additional pretreatment?
- If filter occlusion occurs, how does this impact TR removal efficiency?
    - Would result in bypass of flow because the filters are plugged.

- For the @Risk model, a range of estimated efficiencies will be applied.

I hope this provides some additional framing of the scope. Your first synopsis did a great job in regard to dissolved. Now we just need the TR. I'll dig through your attachments and try to catch up to you a bit.

Thanks!

Josh Bryson | Senior Engineer

Pioneer Technical Services Inc. | 1101 South Montana Street | Butte, MT 59701
Cell: 406.565.7164 jbryson@pioneer-technical.com

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From: Darcy, Sean
To: Josh Bryson; Pedrick, John
Subject: RE: More Clarifications for you.
Date: Monday, February 09, 2015 2:11:51 PM

Hi Josh,

Below are some answers to your questions.

Maintenance

The StormFilter cartridge has a siphon that draws uniform flow throughout the media. A restrictor disc at the base of the cartridge contains an calibrated orifice that maintains the design flow rate (say 10 gpm/cartridge).

The restrictor disc controls the flow until the media begins to restrict flow through the cartridge. When the system falls below the design flow (say 5 to 7 gpm/cartridge) it is time to maintain. In general, a system

with greater than 2-3 inches of sediment on the floor will require maintenance.

PSD

The cartridge hood provides a hanging column and provides uniform flow to the media as the siphon is engaged. It also provides the scrubbing regulators (bubbles) that agitate the outer surface of the media to assist with media longevity.

The higher the flow rate of the cartridge, the more material is captured by the media than settling on the floor. The lower the flow rate of the cartridge, the more material is settled on the outside of the cartridge. So at 7.5 gpm/cartridge the expectation

is that 60% of the material is settled on the floor and 40% of the material is captured in the media. In general, the bulk of the solids captured on the floor are medium to coarse silt and sand.

Mass load

Mass load is site and system specific and the contributing factors are organic matter, hydrocarbons, PSD, runoff volume, and overall incoming load. As a guideline, we recommend 36 lbs for a specific flow rate of 1 gpm/ft2 or 7.5 gpm per 18 inch cartridge.

As a guideline, we recommend 24 lbs for a specific flow rate of 2 gpm/ft2 or 15 gpm per 18 inch cartridge. Assuming 25 lbs of sediment is conservative at a specific flow rate of 1 gpm/ft2, but a value < 24 lbs should be used if operating at a specific flow rate of 2 gpm/ft2.

Sincerely,

Sean Darcy
503-258-3105

_____
From: Josh Bryson [jbryson@pioneer-technical.com]
Sent: Saturday, February 07, 2015 11:42 AM
To: Pedrick, John
Cc: Darcy, Sean
Subject: RE: More Clarifications for you.

Hi Sean-

What would your definition of occluded be? At full submersion of the top of the canisters (a very poorly maintained condition), or somewhere between the floor of the vault and the top?

Is there a certain PSD that is prevented from even reaching the media due to the presence of the hood (i.e. particles greater than 10 µm settle to the floor of the vault, and it takes 25 lbs of sediment less than 10 µm to reach 100% occlusion per cartridge).

For the purposes of our effort, I'll assume the 25 lbs of sediment per cartridge (we initially assumed use of the 18" canisters) and that flow reaching the media is homogenous.

Thanks!

Josh Bryson | Senior Engineer
Pioneer Technical Services Inc. | 1101 South Montana Street | Butte, MT 59701
Cell: 406.565.7164 jbryson@pioneer-technical.com<mailto:jbryson@pioneer-technical.com>

From: Pedrick, John [mailto:JPedrick@conteches.com]
Sent: Saturday, February 07, 2015 2:09 AM
To: Josh Bryson
Cc: Darcy, Sean
Subject: RE: More Clarifications for you.

Josh,

The PSD of the influent would be helpful with respect to correlating TSS removal efficiency results. I'd recommend plotting the influent PSD results and comparing them to the SCS106 testing sediment. The overall capacity of the filter cartridges is 25-50 pounds of sediment per cartridge depending on the height of the cartridge used. Once a cartridge becomes occluded the system will go into bypass. When the cartridges become occluded, I'd expect some settling in the vault but both the solids and total metals removal efficiencies would be significantly reduced. I'm out next week but feel free to follow up with Sean Darcy while I'm out if you have any additional questions.

Regards,

John H. Pedrick, CPSWQ
Project Manager

Contech Engineered Solutions LLC
11815 NE Glenn Widing Drive| Portland, OR 97220
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jpedrick@conteches.com<mailto:public@conteches.com>
www.ContechES.com<http://www.conteches.com/>

From: Josh Bryson [mailto:jbryson@pioneer-technical.com]
Sent: Tuesday, February 03, 2015 10:00 AM
To: Pedrick, John

Cc: Mok, Geoff
Subject: More Clarifications for you.

Hey John,

I went back and looked as our TI assumptions matrix for evaluation of the efficiency of the MetalRx and CSF leaf media products. Here is a list of those assumptions that may assist you in development of your total recoverable efficiency predictions:

- The projected %TSS removal efficiency, in consideration of our gradation and metals fractionation data provided to Contech, should be used to predict the metals removal efficiency.

o How do we correlate Contech's available sediment/surrogate sediment removal efficiencies to our site specific data?

- The overall capacity of the media/filters for TSS. Otherwise, is there some critical loading point of TSS where the StormFilter technology, with MetalRx or CSF media (18" canisters at 1gpm/fr2), becomes occluded or otherwise ineffective?

o The model storm and associated load subjected to the filters will be from a 5-year, 24 hour event.

o Is there a maximum, recommended TSS load that does not require additional pretreatment?

o If filter occlusion occurs, how does this impact TR removal efficiency?

- Would result in bypass of flow because the filters are plugged.

- For the @Risk model, a range of estimated efficiencies will be applied.

I hope this provides some additional framing of the scope. Your first synopsis did a great job in regard to dissolved. Now we just need the TR. I'll dig through your attachments and try to catch up to you a bit.

Thanks!

Josh Bryson | Senior Engineer
Pioneer Technical Services Inc. | 1101 South Montana Street | Butte, MT 59701
Cell: 406.565.7164 jbryson@pioneer-technical.com<mailto:jbryson@pioneer-technical.com>

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APPENDIX C-3

COMPLETE BENCH-SCALE LABORATORY ANALYTICAL REPORTS

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

COMPLETE BENCH-SCALE LABORATORY ANALYTICAL REPORTS

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory on August 06, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request. Samples effected: 008, 009, 036.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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Minneapolis, MN 55414
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CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10237680001	**SD0543-080113**	Water	08/03/13 13:26	08/06/13 08:41
10237680002	**SD0544-080113**	Water	08/03/13 13:29	08/06/13 08:41
10237680003	**SD0545-080113**	Water	08/03/13 13:32	08/06/13 08:41
10237680004	**SD0546-080113**	Water	08/03/13 13:35	08/06/13 08:41
10237680005	**SD0547-080113**	Water	08/03/13 13:39	08/06/13 08:41
10237680006	**SD0548-080113**	Water	08/03/13 13:42	08/06/13 08:41
10237680007	**SD0549-080113**	Water	08/03/13 13:46	08/06/13 08:41
10237680008	**SD0550-080113**	Water	08/03/13 13:50	08/06/13 08:41
10237680009	**SD0551-080113**	Water	08/03/13 13:53	08/06/13 08:41
10237680010	**SD0552-080113**	Water	08/03/13 13:57	08/06/13 08:41
10237680011	**SD0553-080113**	Water	08/03/13 14:03	08/06/13 08:41
10237680012	**SD0554-080113**	Water	08/03/13 14:06	08/06/13 08:41
10237680013	**SD0555-080113**	Water	08/03/13 14:09	08/06/13 08:41
10237680014	**SD0556-080113**	Water	08/03/13 14:12	08/06/13 08:41
10237680015	**SD0557-080113**	Water	08/03/13 14:15	08/06/13 08:41
10237680016	**SD0558-080113**	Water	08/03/13 14:18	08/06/13 08:41
10237680017	**SD0559-080113**	Water	08/03/13 14:21	08/06/13 08:41
10237680018	**SD0560-080113**	Water	08/03/13 14:39	08/06/13 08:41
10237680019	**SD0561-080113**	Water	08/03/13 14:42	08/06/13 08:41
10237680020	**SD0562-080113**	Water	08/03/13 14:45	08/06/13 08:41
10237680021	**SD0563-080113**	Water	08/03/13 14:48	08/06/13 08:41
10237680022	**SD0564-080113**	Water	08/03/13 14:52	08/06/13 08:41
10237680023	**SD0565-080113**	Water	08/04/13 08:11	08/06/13 08:41
10237680024	**SD0566-080113**	Water	08/04/13 08:16	08/06/13 08:41
10237680025	**SD0567-080113**	Water	08/04/13 08:19	08/06/13 08:41
10237680026	**SD0568-080113**	Water	08/04/13 08:23	08/06/13 08:41
10237680027	**SD0569-080113**	Water	08/04/13 08:26	08/06/13 08:41
10237680028	**SD0570-080113**	Water	08/04/13 08:29	08/06/13 08:41
10237680029	**SD0571-080113**	Water	08/04/13 08:32	08/06/13 08:41
10237680030	**SD0572-080113**	Water	08/04/13 08:35	08/06/13 08:41
10237680031	**SD0573-080113**	Water	08/04/13 08:40	08/06/13 08:41
10237680032	**SD0574-080113**	Water	08/04/13 08:43	08/06/13 08:41
10237680033	**SD0575-080113**	Water	08/04/13 08:47	08/06/13 08:41
10237680034	**SD0576-080113**	Water	08/04/13 08:50	08/06/13 08:41
10237680035	**SD0577-080113**	Water	08/04/13 08:54	08/06/13 08:41
10237680036	**SD0578-080113**	Water	08/04/13 08:57	08/06/13 08:41
10237680037	**SD0579-080113**	Water	08/04/13 09:02	08/06/13 08:41

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Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10237680038	**SD0580-080113**	Water	08/04/13 09:09	08/06/13 08:41
10237680039	**SD0581-080113**	Water	08/04/13 09:12	08/06/13 08:41
10237680040	**SD0582-080113**	Water	08/04/13 09:15	08/06/13 08:41
10237680041	**SD0583-080113**	Water	08/04/13 09:19	08/06/13 08:41
10237680042	**SD0584-080113**	Water	08/04/13 09:22	08/06/13 08:41
10237680043	**SD0585-080113**	Water	08/04/13 09:28	08/06/13 08:41
10237680044	**SD0586-080113**	Water	08/04/13 09:32	08/06/13 08:41
10237680045	**SD0587-080113**	Water	08/04/13 09:36	08/06/13 08:41
10237680046	**SD0588-080113**	Water	08/04/13 09:39	08/06/13 08:41
10237680047	**SD0589-080113**	Water	08/04/13 09:45	08/06/13 08:41
10237680048	**SD0590-080113**	Water	08/04/13 09:49	08/06/13 08:41
10237680049	**SD0591-080113**	Water	08/04/13 09:52	08/06/13 08:41
10237680050	**SD0592-080113**	Water	08/04/13 09:55	08/06/13 08:41
10237680051	**SD0593-080113**	Water	08/04/13 09:58	08/06/13 08:41
10237680052	**SD0594-080113**	Water	08/04/13 10:02	08/06/13 08:41
10237680053	**SD0595-080113**	Water	08/04/13 10:08	08/06/13 08:41
10237680054	**SD0596-080113**	Water	08/04/13 10:13	08/06/13 08:41
10237680055	**SD0597-080113**	Water	08/04/13 10:21	08/06/13 08:41
10237680056	**SD0598-080113**	Water	08/04/13 10:23	08/06/13 08:41
10237680057	**SD0599-080113**	Water	08/04/13 10:28	08/06/13 08:41
10237680058	**SD0600-080113**	Water	08/04/13 10:32	08/06/13 08:41
10237680059	**SD0601-080113**	Water	08/04/13 10:39	08/06/13 08:41
10237680060	**SD0602-080113**	Water	08/04/13 10:45	08/06/13 08:41
10237680061	**SD0603-080113**	Water	08/04/13 10:49	08/06/13 08:41
10237680062	**SD0604-080113**	Water	08/04/13 12:13	08/06/13 08:41
10237680063	**SD0605-080113**	Water	08/04/13 12:17	08/06/13 08:41
10237680064	**SD0606-080113**	Water	08/04/13 12:21	08/06/13 08:41
10237680065	**SD0607-080113**	Water	08/04/13 12:25	08/06/13 08:41
10237680066	**SD0608-080113**	Water	08/04/13 12:28	08/06/13 08:41
10237680067	**SD0609-080113**	Water	08/04/13 12:32	08/06/13 08:41
10237680068	**SD0610-080113**	Water	08/04/13 12:35	08/06/13 08:41
10237680069	**SD0611-080113**	Water	08/04/13 12:38	08/06/13 08:41
10237680075	**SD0617-080113**	Water	08/05/13 12:10	08/06/13 08:41
10237680076	**SD0618-080113**	Water	08/05/13 12:16	08/06/13 08:41
10237680077	**SD0619-080113**	Water	08/05/13 12:22	08/06/13 08:41
10237680078	**SD0620-080113**	Water	08/05/13 12:26	08/06/13 08:41
10237680079	**SD0621-080113**	Water	08/05/13 12:30	08/06/13 08:41

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10237680080	**SD0622-080113**	Water	08/05/13 12:34	08/06/13 08:41

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10237680001	**SD0543-080113**	EPA 200.8	AS2	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680002	**SD0544-080113**	EPA 200.8	AS2	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680003	**SD0545-080113**	EPA 200.8	AS2	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680004	**SD0546-080113**	EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680005	**SD0547-080113**	EPA 200.8	AS2	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680006	**SD0548-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680007	**SD0549-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680008	**SD0550-080113**	EPA 200.8	AS2, TT3	12
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10237680009	**SD0551-080113**	EPA 200.8	AS2, TT3	12
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10237680010	**SD0552-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680011	**SD0553-080113**	EPA 200.8	AS2	5
		EPA 200.8	AS2, TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10237680012	**SD0554-080113**	EPA 200.8	AS2	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680013	**SD0555-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680014	**SD0556-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680015	**SD0557-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2, TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680016	**SD0558-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2, TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680017	**SD0559-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680018	**SD0560-080113**	EPA 200.8	AS2	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680019	**SD0561-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680020	**SD0562-080113**	EPA 200.8	AS2, TT3	5
		EPA 200.8	AS2, TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680021	**SD0563-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680022	**SD0564-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680023	**SD0565-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680024	**SD0566-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680025	**SD0567-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680026	**SD0568-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680027	**SD0569-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680028	**SD0570-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680029	**SD0571-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680030	**SD0572-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680031	**SD0573-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680032	**SD0574-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680033	**SD0575-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680034	**SD0576-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680035	**SD0577-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680036	**SD0578-080113**	EPA 200.8	AJM	12
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10237680037	**SD0579-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680038	**SD0580-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680039	**SD0581-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680040	**SD0582-080113**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680041	**SD0583-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10237680042	**SD0584-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680043	**SD0585-080113**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10237680044	**SD0586-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680045	**SD0587-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680046	**SD0588-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680047	**SD0589-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680048	**SD0590-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680049	**SD0591-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680050	**SD0592-080113**	EPA 200.8	AS2, RB1, TT3	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680051	**SD0593-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680052	**SD0594-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680053	**SD0595-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680054	**SD0596-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680055	**SD0597-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10237680056	**SD0598-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10237680057	**SD0599-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680058	**SD0600-080113**	EPA 200.8	AS2, RB1, TT3	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10237680059	**SD0601-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680060	**SD0602-080113**	EPA 200.8	AS2, RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680061	**SD0603-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
10237680062	**SD0604-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680063	**SD0605-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680064	**SD0606-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680065	**SD0607-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680066	**SD0608-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680067	**SD0609-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10237680068	**SD0610-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680069	**SD0611-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10237680075	**SD0617-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10237680076	**SD0618-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10237680077	**SD0619-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10237680078	**SD0620-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10237680079	**SD0621-080113**	EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10237680080	**SD0622-080113**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
75 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41081

B: Analyte was detected in the associated method blank.

- BLANK for HBN 262635 [MPRP/410 (Lab ID: 1495416)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41081

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680041,10237680051

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1495418)
  - Copper
  - Lead
- MS (Lab ID: 1495420)
  - Copper
  - Lead
  - Zinc
- MSD (Lab ID: 1495419)
  - Copper

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

QC Batch: MPRP/41082

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680061,10240505001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1495430)
  - Arsenic
  - Copper
  - Lead
  - Zinc
- MS (Lab ID: 1495432)
  - Zinc
- MSD (Lab ID: 1495431)
  - Arsenic
  - Copper
  - Lead

QC Batch: MPRP/41080

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680021,10237680031

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1495413)
  - Copper
  - Zinc
- MS (Lab ID: 1495415)
  - Arsenic
  - Cadmium
  - Copper
  - Lead
  - Zinc
- MSD (Lab ID: 1495414)
  - Copper
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41081

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1495418)
  - Copper
  - Zinc
- MS (Lab ID: 1495420)
  - Copper
  - Lead
  - Zinc
- MSD (Lab ID: 1495419)
  - Copper

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

Analyte Comments:

QC Batch: MPRP/41081

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1495419)
  - Zinc

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
74 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41089

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680041,10237680051

R1: RPD value was outside control limits.

- MSD (Lab ID: 1495485)
  - Arsenic, Dissolved

QC Batch: MPRP/41090

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680063,10240505001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1495499)
  - Copper, Dissolved
  - Zinc, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
75 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9002

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680042,10237680060

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1495619)
  - Mercury
- MS (Lab ID: 1495621)
  - Mercury
- MSD (Lab ID: 1495620)
  - Mercury

QC Batch: MERP/9003

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680062,10237680080

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1495626)
  - Mercury

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
74 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0550-080113 (Lab ID: 10237680008)
- SD0551-080113 (Lab ID: 10237680009)
- SD0578-080113 (Lab ID: 10237680036)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
70 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0550-080113 (Lab ID: 10237680008)
- SD0551-080113 (Lab ID: 10237680009)
- SD0578-080113 (Lab ID: 10237680036)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0550-080113 (Lab ID: 10237680008)
- SD0551-080113 (Lab ID: 10237680009)
- SD0578-080113 (Lab ID: 10237680036)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
70 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/15707

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237680027,10237714001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1496723)
  - Sulfate
- MSD (Lab ID: 1496724)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0550-080113 (Lab ID: 10237680008)
- SD0551-080113 (Lab ID: 10237680009)
- SD0578-080113 (Lab ID: 10237680036)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0550-080113 (Lab ID: 10237680008)
- SD0551-080113 (Lab ID: 10237680009)
- SD0578-080113 (Lab ID: 10237680036)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0543-080113 **Lab ID: 10237680001** Collected: 08/03/13 13:26 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 02:20	7440-38-2	
Cadmium	**0.00039**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 02:20	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 02:20	7440-50-8	
Lead	**0.014**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 02:20	7439-92-1	
Zinc	**0.062**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 02:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.015**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:02	7440-38-2	
Cadmium, Dissolved	**0.00036**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:02	7440-43-9	
Copper, Dissolved	**0.092**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:02	7440-50-8	
Lead, Dissolved	**0.0090**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:02	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 12:50	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**20.8**	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**31.5**	mg/L	5.0	2.5	2		08/07/13 14:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0544-080113 **Lab ID: 10237680002** Collected: 08/03/13 13:29 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 02:30	7440-38-2	
Cadmium	**0.00038**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 02:30	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 02:30	7440-50-8	
Lead	**0.017**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 02:30	7439-92-1	
Zinc	**0.066**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 02:30	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:34	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:34	7440-43-9	
Copper, Dissolved	**0.068**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:34	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:34	7439-92-1	
Zinc, Dissolved	**0.028**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 12:52	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**82.2**	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**26.7**	mg/L	2.5	1.2	1		08/07/13 14:08	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0545-080113 **Lab ID: 10237680003** Collected: 08/03/13 13:32 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 02:34	7440-38-2	
Cadmium	**0.00062**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 02:34	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 02:34	7440-50-8	
Lead	**0.045**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 02:34	7439-92-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 02:34	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:39	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:39	7440-43-9	
Copper, Dissolved	**0.060**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:39	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:39	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:41	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:05	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**118**	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.0**	mg/L	2.5	1.2	1		08/07/13 14:08	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0546-080113 **Lab ID: 10237680004** Collected: 08/03/13 13:35 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.027**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 02:39	7440-38-2	
Cadmium	**0.00090**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 02:39	7440-43-9	
Copper	**0.29**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 02:39	7440-50-8	
Lead	**0.071**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 02:39	7439-92-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 02:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**212**	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		08/07/13 14:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0547-080113 **Lab ID: 10237680005** Collected: 08/03/13 13:39 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.032**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 02:44	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 02:44	7440-43-9	
Copper	**0.43**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 02:44	7440-50-8	
Lead	**0.097**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 02:44	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 02:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:43	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:43	7440-43-9	
Copper, Dissolved	**0.061**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:43	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:43	7439-92-1	
Zinc, Dissolved	**0.014**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:46	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**368**	mg/L	20.0	10.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.1**	mg/L	2.5	1.2	1		08/07/13 14:11	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0548-080113 **Lab ID: 10237680006** Collected: 08/03/13 13:42 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.050**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:22	7440-38-2	
Cadmium	**0.0024**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:22	7440-43-9	
Copper	**0.90**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/26/13 11:27	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 03:22	7439-92-1	
Zinc	**0.72**	mg/L	0.025	0.0049	5	08/11/13 09:06	08/26/13 11:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0099**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:48	7440-38-2	
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:48	7440-43-9	
Copper, Dissolved	**0.057**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:48	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:48	7439-92-1	
Zinc, Dissolved	**0.014**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:09	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**645**	mg/L	20.0	10.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.1**	mg/L	2.5	1.2	1		08/07/13 14:11	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0549-080113 **Lab ID: 10237680007** Collected: 08/03/13 13:46 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.043**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:27	7440-38-2	
Cadmium	**0.0034**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:27	7440-43-9	
Copper	**0.93**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:13	7440-50-8	
Lead	**0.23**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 03:27	7439-92-1	
Zinc	**0.88**	mg/L	0.025	0.0049	5	08/11/13 09:06	08/22/13 19:13	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:53	7440-38-2	
Cadmium, Dissolved	**0.00023**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:53	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:53	7440-50-8	
Lead, Dissolved	**0.0047**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:53	7439-92-1	
Zinc, Dissolved	**0.029**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:12	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**976**	mg/L	20.0	10.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.8**	mg/L	2.5	1.2	1		08/07/13 14:11	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0550-080113 **Lab ID: 10237680008** Collected: 08/03/13 13:50 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.048**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:32	7440-38-2	
Cadmium	**0.0066**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:32	7440-43-9	
Calcium	**52900**	ug/L	100	48.9	5	08/11/13 09:06	08/22/13 19:18	7440-70-2	
Copper	**0.74**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:18	7440-50-8	
Iron	**18900**	ug/L	250	29.5	5	08/11/13 09:06	08/22/13 19:18	7439-89-6	
Lead	**0.62**	mg/L	0.00050	0.00023	5	08/11/13 09:06	08/22/13 19:18	7439-92-1	
Magnesium	**13000**	ug/L	25.0	11.9	5	08/11/13 09:06	08/22/13 19:18	7439-95-4	
Manganese	**2130**	ug/L	2.5	0.92	5	08/11/13 09:06	08/22/13 19:18	7439-96-5	
Potassium	**9660**	ug/L	100	23.6	5	08/11/13 09:06	08/22/13 19:18	7440-09-7	
Silica	**88300**	ug/L	268	134	5	08/11/13 09:06	08/22/13 19:18	7631-86-9	
Sodium	**4350**	ug/L	250	51.4	5	08/11/13 09:06	08/22/13 19:18	7440-23-5	
Zinc	**2.2**	mg/L	0.025	0.0049	5	08/11/13 09:06	08/22/13 19:18	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0083**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 05:58	7440-38-2	
Cadmium, Dissolved	**0.00023**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 05:58	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 05:58	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 05:58	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 05:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**98.8**	mg/L	5.0	2.5	1		01/03/14 12:21		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1320**	mg/L	50.0	25.0	1		08/07/13 09:52		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.7**	Std. Units	0.10	0.050	1		12/31/13 14:48		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.3**	mg/L	0.10	0.050	1		01/03/14 12:08	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.3**	mg/L	0.10	0.050	1		01/03/14 12:08		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.6**	mg/L	2.5	1.2	1		08/07/13 14:13	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**12.5**	mg/L	2.0	1.0	1		01/02/14 14:18	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0550-080113 **Lab ID: 10237680008** Collected: 08/03/13 13:50 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:48	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0551-080113 **Lab ID: 10237680009** Collected: 08/03/13 13:53 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.044**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:37	7440-38-2	
Cadmium	**0.0070**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:37	7440-43-9	
Calcium	**54.2**	mg/L	0.10	0.049	5	08/11/13 09:06	08/22/13 19:23	7440-70-2	
Copper	**0.74**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:23	7440-50-8	
Iron	**15.7**	mg/L	0.25	0.030	5	08/11/13 09:06	08/22/13 19:23	7439-89-6	
Lead	**0.62**	mg/L	0.00050	0.00023	5	08/11/13 09:06	08/22/13 19:23	7439-92-1	
Magnesium	**12.2**	mg/L	0.025	0.012	5	08/11/13 09:06	08/22/13 19:23	7439-95-4	
Manganese	**2.2**	mg/L	0.0025	0.00092	5	08/11/13 09:06	08/22/13 19:23	7439-96-5	
Potassium	**9.0**	mg/L	0.10	0.024	5	08/11/13 09:06	08/22/13 19:23	7440-09-7	
Silica	**76.2**	mg/L	0.27	0.13	5	08/11/13 09:06	08/22/13 19:23	7631-86-9	
Sodium	**4.1**	mg/L	0.25	0.051	5	08/11/13 09:06	08/22/13 19:23	7440-23-5	
Zinc	**2.2**	mg/L	0.025	0.0049	5	08/11/13 09:06	08/22/13 19:23	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0082**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:03	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 06:03	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:03	7440-50-8	
Lead, Dissolved	**0.0031**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:03	7439-92-1	
Zinc, Dissolved	**0.029**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 11:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:17	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**92.7**	mg/L	5.0	2.5	1		01/03/14 12:35		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1010**	mg/L	50.0	25.0	1		08/07/13 09:52		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.9**	Std. Units	0.10	0.050	1		12/31/13 14:50		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.2**	mg/L	0.10	0.050	1		01/03/14 12:10	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		01/03/14 12:10		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.7**	mg/L	2.5	1.2	1		08/07/13 14:13	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**11.9**	mg/L	2.0	1.0	1		01/02/14 14:18	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0551-080113 **Lab ID: 10237680009** Collected: 08/03/13 13:53 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:48	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0552-080113 **Lab ID: 10237680010** Collected: 08/03/13 13:57 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:42	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:42	7440-43-9	
Copper	**0.00027J**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 03:42	7440-50-8	
Lead	**0.000046J**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 19:27	7439-92-1	
Zinc	**0.0014J**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 03:42	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:07	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 06:07	7440-43-9	
Copper, Dissolved	**0.00037J**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:07	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:07	7439-92-1	
Zinc, Dissolved	**0.0023J**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:03	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:19	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		08/07/13 14:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0553-080113 **Lab ID: 10237680011** Collected: 08/03/13 14:03 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:47	7440-38-2	
Cadmium	**0.00054**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:47	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 03:47	7440-50-8	
Lead	**0.043**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 03:47	7439-92-1	
Zinc	**0.15**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 03:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0082**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:39	7440-38-2	
Cadmium, Dissolved	**0.000062J**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 20:22	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:39	7440-50-8	
Lead, Dissolved	**0.0010**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:39	7439-92-1	
Zinc, Dissolved	**0.0086**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:27	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**166**	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.4**	mg/L	2.5	1.2	1		08/07/13 14:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0554-080113 **Lab ID: 10237680012** Collected: 08/03/13 14:06 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 03:58	7440-38-2	
Cadmium	**0.00073**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 03:58	7440-43-9	
Copper	**0.37**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 03:58	7440-50-8	
Lead	**0.059**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 03:58	7439-92-1	
Zinc	**0.21**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 03:58	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:44	7440-38-2	
Cadmium, Dissolved	**0.00022**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 06:44	7440-43-9	
Copper, Dissolved	**0.10**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:44	7440-50-8	
Lead, Dissolved	**0.012**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:44	7439-92-1	
Zinc, Dissolved	**0.044**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:08	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:29	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**226**	mg/L	10.0	5.0	1		08/07/13 09:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.4**	mg/L	2.5	1.2	1		08/07/13 14:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0555-080113 **Lab ID: 10237680013** Collected: 08/03/13 14:09 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.046**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:03	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:03	7440-43-9	
Copper	**0.60**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:32	7440-50-8	
Lead	**0.081**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:03	7439-92-1	
Zinc	**0.32**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 04:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:48	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 06:48	7440-43-9	
Copper, Dissolved	**0.086**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:48	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:48	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:10	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:32	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**327**	mg/L	14.3	7.1	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.3**	mg/L	2.5	1.2	1		08/07/13 14:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0556-080113 **Lab ID: 10237680014** Collected: 08/03/13 14:12 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.039**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:08	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:08	7440-43-9	
Copper	**0.55**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:37	7440-50-8	
Lead	**0.076**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:08	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 04:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:53	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 06:53	7440-43-9	
Copper, Dissolved	**0.082**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:53	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:53	7439-92-1	
Zinc, Dissolved	**0.014**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:13	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**370**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.9**	mg/L	2.5	1.2	1		08/07/13 14:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0557-080113 **Lab ID: 10237680015** Collected: 08/03/13 14:15 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.036**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:33	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:33	7440-43-9	
Copper	**0.64**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:42	7440-50-8	
Lead	**0.11**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:33	7439-92-1	
Zinc	**0.36**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 04:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0087**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 06:58	7440-38-2	
Cadmium, Dissolved	**0.000070J**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 20:26	7440-43-9	
Copper, Dissolved	**0.060**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 06:58	7440-50-8	
Lead, Dissolved	**0.00094**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 06:58	7439-92-1	
Zinc, Dissolved	**0.0090**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 06:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:36	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**619**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.4**	mg/L	2.5	1.2	1		08/07/13 14:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0558-080113 **Lab ID: 10237680016** Collected: 08/03/13 14:18 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.040**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:38	7440-38-2	
Cadmium	**0.0039**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:38	7440-43-9	
Copper	**1.4**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 19:47	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:38	7439-92-1	
Zinc	**0.84**	mg/L	0.025	0.0049	5	08/11/13 09:06	08/22/13 19:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 07:24	7440-38-2	
Cadmium, Dissolved	**0.000091**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 20:31	7440-43-9	
Copper, Dissolved	**0.065**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 07:24	7440-50-8	
Lead, Dissolved	**0.00098**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 07:24	7439-92-1	
Zinc, Dissolved	**0.0072**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 07:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:39	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1640**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.2**	mg/L	2.5	1.2	1		08/07/13 14:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0559-080113 **Lab ID: 10237680017** Collected: 08/03/13 14:21 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.17**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:42	7440-38-2	
Cadmium	**0.0093**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:42	7440-43-9	
Copper	**4.1**	mg/L	0.0050	0.0017	10	08/11/13 09:06	08/22/13 19:52	7440-50-8	
Lead	**0.34**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:42	7439-92-1	
Zinc	**2.3**	mg/L	0.050	0.0098	10	08/11/13 09:06	08/22/13 19:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.017**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 07:29	7440-38-2	
Cadmium, Dissolved	**0.00058**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 07:29	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 07:29	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 07:29	7439-92-1	
Zinc, Dissolved	**0.050**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 07:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:41	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**3600**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**36.9**	mg/L	5.0	2.5	2		08/07/13 14:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0560-080113 **Lab ID: 10237680018** Collected: 08/03/13 14:39 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.028**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:47	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:47	7440-43-9	
Copper	**0.34**	mg/L	0.00050	0.00017	1	08/11/13 09:06	08/22/13 04:47	7440-50-8	
Lead	**0.078**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:47	7439-92-1	
Zinc	**0.26**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 04:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 07:34	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 07:34	7440-43-9	
Copper, Dissolved	**0.056**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 07:34	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 07:34	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 07:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:49	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**423**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.7**	mg/L	2.5	1.2	1		08/07/13 14:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0561-080113 **Lab ID: 10237680019** Collected: 08/03/13 14:42 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.042**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:52	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:52	7440-43-9	
Copper	**0.58**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 20:12	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:52	7439-92-1	
Zinc	**0.39**	mg/L	0.0050	0.00098	1	08/11/13 09:06	08/22/13 04:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0097**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 07:38	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 07:38	7440-43-9	
Copper, Dissolved	**0.056**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 07:38	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 07:38	7439-92-1	
Zinc, Dissolved	**0.016**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 07:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:30	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**492**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.4**	mg/L	2.5	1.2	1		08/07/13 14:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0562-080113 **Lab ID: 10237680020** Collected: 08/03/13 14:45 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.052**	mg/L	0.00050	0.000093	1	08/11/13 09:06	08/22/13 04:57	7440-38-2	
Cadmium	**0.0025**	mg/L	0.000080	0.000032	1	08/11/13 09:06	08/22/13 04:57	7440-43-9	
Copper	**0.94**	mg/L	0.0025	0.00087	5	08/11/13 09:06	08/22/13 20:17	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	08/11/13 09:06	08/22/13 04:57	7439-92-1	
Zinc	**0.63**	mg/L	0.025	0.0049	5	08/11/13 09:06	08/22/13 20:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0097**	mg/L	0.00050	0.000093	1	08/09/13 17:35	08/22/13 07:43	7440-38-2	
Cadmium, Dissolved	**0.00012**	mg/L	0.000080	0.000032	1	08/09/13 17:35	08/22/13 20:36	7440-43-9	
Copper, Dissolved	**0.057**	mg/L	0.00050	0.00017	1	08/09/13 17:35	08/22/13 07:43	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	08/09/13 17:35	08/22/13 07:43	7439-92-1	
Zinc, Dissolved	**0.011**	mg/L	0.0050	0.00098	1	08/09/13 17:35	08/22/13 07:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 14:56	08/13/13 12:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/09/13 17:47	08/13/13 13:54	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**891**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.3**	mg/L	2.5	1.2	1		08/07/13 14:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0563-080113 **Lab ID: 10237680021** Collected: 08/03/13 14:48 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.071**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 10:17	7440-38-2	
Cadmium	**0.0061**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 10:17	7440-43-9	
Copper	**1.8**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 10:20	7440-50-8	M1
Lead	**0.47**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 10:20	7439-92-1	
Zinc	**1.8**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 10:20	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0096**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:05	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:05	7440-43-9	
Copper, Dissolved	**0.038**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:05	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:05	7439-92-1	
Zinc, Dissolved	**0.018**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00085**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:29	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:29	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1630**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.9**	mg/L	2.5	1.2	1		08/07/13 14:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0564-080113 **Lab ID: 10237680022** Collected: 08/03/13 14:52 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.036**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 10:28	7440-38-2	
Cadmium	**0.0038**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 10:28	7440-43-9	
Copper	**0.74**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/26/13 10:38	7440-50-8	
Lead	**0.26**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 10:28	7439-92-1	
Zinc	**1.4**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/26/13 10:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0039**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:16	7440-38-2	
Cadmium, Dissolved	**0.000078J**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:16	7440-43-9	
Copper, Dissolved	**0.020**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:16	7440-50-8	
Lead, Dissolved	**0.00094**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:16	7439-92-1	
Zinc, Dissolved	**0.043**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00045**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:31	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:31	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1470**	mg/L	20.0	10.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		08/07/13 14:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0565-080113 **Lab ID: 10237680023** Collected: 08/04/13 08:11 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.043**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 10:33	7440-38-2	
Cadmium	**0.0059**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 10:33	7440-43-9	
Copper	**0.45**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 10:36	7440-50-8	
Lead	**0.56**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 10:36	7439-92-1	
Zinc	**2.1**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 10:36	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0077**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:19	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:19	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:19	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:19	7439-92-1	
Zinc, Dissolved	**0.043**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00085**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:34	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**793**	mg/L	10.0	5.0	1		08/07/13 09:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.6**	mg/L	2.5	1.2	1		08/07/13 14:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0566-080113 **Lab ID: 10237680024** Collected: 08/04/13 08:16 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.028**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 10:47	7440-38-2	
Cadmium	**0.0028**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 10:47	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/23/13 10:47	7440-50-8	
Lead	**0.25**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 10:47	7439-92-1	
Zinc	**1.0**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 10:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0095**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:22	7440-38-2	
Cadmium, Dissolved	**0.00039**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:22	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:22	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:22	7439-92-1	
Zinc, Dissolved	**0.083**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00026**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:46	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**185**	mg/L	20.0	10.0	1		08/07/13 09:58		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.4**	mg/L	2.5	1.2	1		08/07/13 14:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0567-080113 **Lab ID: 10237680025** Collected: 08/04/13 08:19 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.032**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 10:52	7440-38-2	
Cadmium	**0.0036**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 10:52	7440-43-9	
Copper	**0.31**	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/23/13 10:52	7440-50-8	
Lead	**0.33**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 10:52	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 10:55	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0078**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:25	7440-38-2	
Cadmium, Dissolved	**0.00033**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:25	7440-43-9	
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:25	7440-50-8	
Lead, Dissolved	**0.0026**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:25	7439-92-1	
Zinc, Dissolved	**0.061**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00040**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:43	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:48	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**415**	mg/L	20.0	10.0	1		08/07/13 09:58		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.8**	mg/L	2.5	1.2	1		08/07/13 14:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0568-080113 **Lab ID: 10237680026** Collected: 08/04/13 08:23 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.068**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/26/13 10:41	7440-38-2	
Cadmium	**0.0087**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/26/13 10:41	7440-43-9	
Copper	**0.69**	mg/L	0.0050	0.0017	10	08/11/13 09:01	08/29/13 12:20	7440-50-8	
Lead	**1.0**	mg/L	0.0010	0.00046	10	08/11/13 09:01	08/29/13 12:20	7439-92-1	
Zinc	**3.5**	mg/L	0.050	0.0098	10	08/11/13 09:01	08/29/13 12:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0085**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:36	7440-38-2	
Cadmium, Dissolved	**0.00037**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:36	7440-43-9	
Copper, Dissolved	**0.048**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:36	7440-50-8	
Lead, Dissolved	**0.0038**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:36	7439-92-1	
Zinc, Dissolved	**0.048**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1050**	mg/L	20.0	10.0	1		08/07/13 09:58		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.6**	mg/L	2.5	1.2	1		08/07/13 14:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0569-080113 **Lab ID: 10237680027** Collected: 08/04/13 08:26 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.13**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 11:06	7440-38-2	
Cadmium	**0.026**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 11:06	7440-43-9	
Copper	**1.7**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 11:08	7440-50-8	
Lead	**2.4**	mg/L	0.0020	0.00092	20	08/11/13 09:01	08/23/13 11:11	7439-92-1	
Zinc	**9.2**	mg/L	0.25	0.049	50	08/11/13 09:01	08/23/13 13:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:39	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:39	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:39	7440-50-8	
Lead, Dissolved	**0.0049**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:39	7439-92-1	
Zinc, Dissolved	**0.028**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0046**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**4110**	mg/L	50.0	25.0	1		08/07/13 09:58		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.3**	mg/L	2.5	1.2	1		08/07/13 14:47	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0570-080113 **Lab ID: 10237680028** Collected: 08/04/13 08:29 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.099**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 11:22	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 11:22	7440-43-9	
Copper	**1.6**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 11:25	7440-50-8	
Lead	**1.7**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 11:25	7439-92-1	
Zinc	**5.0**	mg/L	0.10	0.020	20	08/11/13 09:01	08/23/13 11:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0076**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:42	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:42	7440-43-9	
Copper, Dissolved	**0.038**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:42	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:42	7439-92-1	
Zinc, Dissolved	**0.024**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**3210**	mg/L	100	50.0	1		08/08/13 11:53		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.4**	mg/L	2.5	1.2	1		08/07/13 14:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0571-080113 **Lab ID: 10237680029** Collected: 08/04/13 08:32 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.083**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 11:30	7440-38-2	
Cadmium	**0.015**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 11:30	7440-43-9	
Copper	**1.4**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 11:33	7440-50-8	
Lead	**1.5**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 11:33	7439-92-1	
Zinc	**4.5**	mg/L	0.10	0.020	20	08/11/13 09:01	08/23/13 11:35	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0079**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:45	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:45	7440-43-9	
Copper, Dissolved	**0.039**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:45	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:45	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00099**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 07:58	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 14:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2390**	mg/L	100	50.0	1		08/08/13 11:53		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.9**	mg/L	2.5	1.2	1		08/07/13 14:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0572-080113 **Lab ID: 10237680030** Collected: 08/04/13 08:35 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/26/13 10:43	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/26/13 10:43	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/26/13 10:43	7440-50-8	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/26/13 10:43	7439-92-1	
Zinc	**0.0021J**	mg/L	0.0050	0.00098	1	08/11/13 09:01	08/26/13 10:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:48	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:48	7440-43-9	
Copper, Dissolved	**0.00024J**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:48	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:48	7439-92-1	
Zinc, Dissolved	**0.0016J**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:01	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:06	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/08/13 11:53		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		08/07/13 14:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0573-080113 **Lab ID: 10237680031** Collected: 08/04/13 08:40 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.037**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 11:44	7440-38-2	M1
Cadmium	**0.0034**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 11:44	7440-43-9	M1
Copper	**0.30**	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/23/13 11:44	7440-50-8	M1
Lead	**0.39**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 11:44	7439-92-1	M1
Zinc	**1.6**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 11:46	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:50	7440-38-2	
Cadmium, Dissolved	**0.00060**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:50	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:50	7440-50-8	
Lead, Dissolved	**0.0038**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:50	7439-92-1	
Zinc, Dissolved	**0.075**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00092**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:03	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:08	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**331**	mg/L	20.0	10.0	1		08/08/13 11:53		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**27.1**	mg/L	2.5	1.2	1		08/07/13 14:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0574-080113 **Lab ID: 10237680032** Collected: 08/04/13 08:43 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.043**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:00	7440-38-2	
Cadmium	**0.0053**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:00	7440-43-9	
Copper	**0.40**	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/23/13 12:00	7440-50-8	
Lead	**0.74**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 12:03	7439-92-1	
Zinc	**2.3**	mg/L	0.050	0.0098	10	08/11/13 09:01	08/23/13 12:06	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:56	7440-38-2	
Cadmium, Dissolved	**0.00055**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:56	7440-43-9	
Copper, Dissolved	**0.052**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:56	7440-50-8	
Lead, Dissolved	**0.0048**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:56	7439-92-1	
Zinc, Dissolved	**0.085**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:10	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**428**	mg/L	20.0	10.0	1		08/08/13 11:53		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**22.3**	mg/L	2.5	1.2	1		08/07/13 14:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0575-080113 **Lab ID: 10237680033** Collected: 08/04/13 08:47 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.058**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:08	7440-38-2	
Cadmium	**0.010**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:08	7440-43-9	
Copper	**0.64**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 12:11	7440-50-8	
Lead	**0.94**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 12:11	7439-92-1	
Zinc	**4.0**	mg/L	0.050	0.0098	10	08/11/13 09:01	08/23/13 12:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 19:59	7440-38-2	
Cadmium, Dissolved	**0.00056**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 19:59	7440-43-9	
Copper, Dissolved	**0.054**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 19:59	7440-50-8	
Lead, Dissolved	**0.023**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 19:59	7439-92-1	
Zinc, Dissolved	**0.13**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 19:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0031**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:08	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000031J**	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**819**	mg/L	20.0	10.0	1		08/08/13 11:53		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.6**	mg/L	2.5	1.2	1		08/07/13 14:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0576-080113 **Lab ID: 10237680034** Collected: 08/04/13 08:50 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.12**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:17	7440-38-2	
Cadmium	**0.029**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:17	7440-43-9	
Copper	**1.9**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 12:19	7440-50-8	
Lead	**2.4**	mg/L	0.0020	0.00092	20	08/11/13 09:01	08/23/13 12:22	7439-92-1	
Zinc	**9.9**	mg/L	0.25	0.049	50	08/11/13 09:01	08/23/13 13:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:02	7440-38-2	
Cadmium, Dissolved	**0.00035**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:02	7440-43-9	
Copper, Dissolved	**0.052**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:02	7440-50-8	
Lead, Dissolved	**0.0051**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:02	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0067**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2950**	mg/L	20.0	10.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.2**	mg/L	2.5	1.2	1		08/07/13 14:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0577-080113 **Lab ID: 10237680035** Collected: 08/04/13 08:54 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.089**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:33	7440-38-2	
Cadmium	**0.011**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:33	7440-43-9	
Copper	**1.1**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 12:35	7440-50-8	
Lead	**1.3**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 12:35	7439-92-1	
Zinc	**3.7**	mg/L	0.050	0.0098	10	08/11/13 09:01	08/23/13 12:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:13	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:13	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:13	7440-50-8	
Lead, Dissolved	**0.0032**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:13	7439-92-1	
Zinc, Dissolved	**0.031**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1840**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.5**	mg/L	2.5	1.2	1		08/07/13 14:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0578-080113 **Lab ID: 10237680036** Collected: 08/04/13 08:57 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.052**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:41	7440-38-2	
Cadmium	**0.0059**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:41	7440-43-9	
Calcium	**79.4**	mg/L	0.20	0.098	10	08/11/13 09:01	08/29/13 12:23	7440-70-2	
Copper	**0.56**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 12:43	7440-50-8	
Iron	**33.5**	mg/L	0.50	0.059	10	08/11/13 09:01	08/29/13 12:23	7439-89-6	
Lead	**0.62**	mg/L	0.00050	0.00023	5	08/11/13 09:01	08/23/13 12:43	7439-92-1	
Magnesium	**18.3**	mg/L	0.050	0.024	10	08/11/13 09:01	08/29/13 12:23	7439-95-4	
Manganese	**4.2**	mg/L	0.0050	0.0018	10	08/11/13 09:01	08/29/13 12:23	7439-96-5	
Potassium	**10.7**	mg/L	0.20	0.047	10	08/11/13 09:01	08/29/13 12:23	7440-09-7	
Silica	**139000**	ug/L	535	268	10	08/11/13 09:01	08/29/13 12:23	7631-86-9	
Sodium	**6.2**	mg/L	0.50	0.10	10	08/11/13 09:01	08/29/13 12:23	7440-23-5	
Zinc	**2.5**	mg/L	0.050	0.0098	10	08/11/13 09:01	08/29/13 12:23	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0053**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:16	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:16	7440-43-9	
Copper, Dissolved	**0.017**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:16	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:16	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0010**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:20	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**91.8**	mg/L	5.0	2.5	1		01/03/14 12:39		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2310**	mg/L	50.0	25.0	1		08/08/13 11:59		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.1**	Std. Units	0.10	0.050	1		12/31/13 14:52		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.0**	mg/L	0.10	0.050	1		01/03/14 12:13	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.0**	mg/L	0.10	0.050	1		01/03/14 12:13		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.5**	mg/L	2.5	1.2	1		08/07/13 14:52	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**5.1**	mg/L	2.0	1.0	1		01/02/14 14:18	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0578-080113 **Lab ID: 10237680036** Collected: 08/04/13 08:57 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:48	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0579-080113 **Lab ID: 10237680037** Collected: 08/04/13 09:02 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.031**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:46	7440-38-2	
Cadmium	**0.0032**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:46	7440-43-9	
Copper	**0.30**	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/23/13 12:46	7440-50-8	
Lead	**0.31**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 12:46	7439-92-1	
Zinc	**1.2**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 12:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0078**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:19	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:19	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:19	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:19	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00044**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**315**	mg/L	20.0	10.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.4**	mg/L	2.5	1.2	1		08/07/13 15:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0580-080113 **Lab ID: 10237680038** Collected: 08/04/13 09:09 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.034**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 12:52	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 12:52	7440-43-9	
Copper	**0.43**	mg/L	0.00050	0.00017	1	08/11/13 09:01	08/23/13 12:52	7440-50-8	
Lead	**0.11**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 12:52	7439-92-1	
Zinc	**0.35**	mg/L	0.0050	0.00098	1	08/11/13 09:01	08/23/13 12:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:22	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:22	7440-43-9	
Copper, Dissolved	**0.059**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:22	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:22	7439-92-1	
Zinc, Dissolved	**0.024**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**274**	mg/L	20.0	10.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.0**	mg/L	2.5	1.2	1		08/07/13 15:20	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0581-080113 **Lab ID: 10237680039** Collected: 08/04/13 09:12 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 13:14	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 13:14	7440-43-9	
Copper	**0.49**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 13:16	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 13:14	7439-92-1	
Zinc	**0.42**	mg/L	0.0050	0.00098	1	08/11/13 09:01	08/23/13 13:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0091**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:24	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:24	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:24	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:24	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:33	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**431**	mg/L	20.0	10.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.3**	mg/L	2.5	1.2	1		08/07/13 15:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0582-080113 **Lab ID: 10237680040** Collected: 08/04/13 09:15 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.061**	mg/L	0.00050	0.000093	1	08/11/13 09:01	08/23/13 13:19	7440-38-2	
Cadmium	**0.0029**	mg/L	0.000080	0.000032	1	08/11/13 09:01	08/23/13 13:19	7440-43-9	
Copper	**1.1**	mg/L	0.0025	0.00087	5	08/11/13 09:01	08/23/13 13:22	7440-50-8	
Lead	**0.23**	mg/L	0.00010	0.000046	1	08/11/13 09:01	08/23/13 13:19	7439-92-1	
Zinc	**0.77**	mg/L	0.025	0.0049	5	08/11/13 09:01	08/23/13 13:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0096**	mg/L	0.00050	0.000093	1	08/09/13 17:42	08/26/13 20:27	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	08/09/13 17:42	08/26/13 20:27	7440-43-9	
Copper, Dissolved	**0.056**	mg/L	0.00050	0.00017	1	08/09/13 17:42	08/26/13 20:27	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	08/09/13 17:42	08/26/13 20:27	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	08/09/13 17:42	08/26/13 20:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00026**	mg/L	0.00020	0.000030	1	08/15/13 13:41	08/16/13 08:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:59	08/13/13 15:35	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**769**	mg/L	20.0	10.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.8**	mg/L	2.5	1.2	1		08/07/13 15:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0583-080113 **Lab ID: 10237680041** Collected: 08/04/13 09:19 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.089**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/20/13 23:39	7440-38-2	
Cadmium	**0.0055**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 22:59	7440-43-9	
Copper	**1.6**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/20/13 23:44	7440-50-8	M1
Lead	**0.43**	mg/L	0.00010	0.000046	1	08/11/13 08:54	08/21/13 22:59	7439-92-1	M1
Zinc	**1.4**	mg/L	0.025	0.0049	5	08/11/13 08:54	08/21/13 23:04	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 01:23	7440-38-2	R1
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 01:23	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 01:23	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 01:23	7439-92-1	
Zinc, Dissolved	**0.021**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 01:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00087**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 11:54	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1420**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.7**	mg/L	2.5	1.2	1		08/07/13 15:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0584-080113 **Lab ID: 10237680042** Collected: 08/04/13 09:22 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.12**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/20/13 23:49	7440-38-2	
Cadmium	**0.011**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/20/13 23:49	7440-43-9	
Copper	**1.8**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/20/13 23:54	7440-50-8	
Lead	**0.92**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/21/13 23:09	7439-92-1	
Zinc	**3.1**	mg/L	0.050	0.0098	10	08/11/13 08:54	08/20/13 23:59	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0079**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 01:43	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 01:43	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 01:43	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 01:43	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 01:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:27	7439-97-6	M1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 11:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**3280**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.6**	mg/L	2.5	1.2	1		08/07/13 15:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0585-080113 **Lab ID: 10237680043** Collected: 08/04/13 09:28 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.16**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 00:04	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 00:04	7440-43-9	
Copper	**1.3**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 00:42	7440-50-8	
Lead	**3.2**	mg/L	0.0020	0.00092	20	08/11/13 08:54	08/21/13 00:47	7439-92-1	
Zinc	**8.6**	mg/L	0.10	0.020	20	08/11/13 08:54	08/21/13 00:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 01:48	7440-38-2	
Cadmium, Dissolved	**0.00050**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 01:48	7440-43-9	
Copper, Dissolved	**0.056**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 01:48	7440-50-8	
Lead, Dissolved	**0.019**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 01:48	7439-92-1	
Zinc, Dissolved	**0.080**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 01:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:45	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:09	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0586-080113 **Lab ID: 10237680044** Collected: 08/04/13 09:32 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.12**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 00:52	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 00:52	7440-43-9	
Copper	**1.2**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 00:58	7440-50-8	
Lead	**1.9**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/21/13 23:19	7439-92-1	
Zinc	**6.3**	mg/L	0.10	0.020	20	08/11/13 08:54	08/21/13 01:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:08	7440-38-2	
Cadmium, Dissolved	**0.00085**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:08	7440-43-9	
Copper, Dissolved	**0.059**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:08	7440-50-8	
Lead, Dissolved	**0.020**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:08	7439-92-1	
Zinc, Dissolved	**0.13**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00087**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:11	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2230**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.1**	mg/L	2.5	1.2	1		08/07/13 15:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0587-080113 **Lab ID: 10237680045** Collected: 08/04/13 09:36 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.12**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 01:08	7440-38-2	
Cadmium	**0.015**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 01:08	7440-43-9	
Copper	**0.88**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 01:14	7440-50-8	
Lead	**2.5**	mg/L	0.0010	0.00046	10	08/11/13 08:54	08/21/13 23:24	7439-92-1	
Zinc	**6.9**	mg/L	0.10	0.020	20	08/11/13 08:54	08/21/13 01:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:13	7440-38-2	
Cadmium, Dissolved	**0.0014**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:13	7440-43-9	
Copper, Dissolved	**0.072**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:13	7440-50-8	
Lead, Dissolved	**0.011**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:13	7439-92-1	
Zinc, Dissolved	**0.27**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00073**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:50	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1270**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.6**	mg/L	2.5	1.2	1		08/07/13 15:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0588-080113 **Lab ID: 10237680046** Collected: 08/04/13 09:39 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.21**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 01:24	7440-38-2	
Cadmium	**0.036**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 01:24	7440-43-9	
Copper	**2.3**	mg/L	0.0050	0.0017	10	08/11/13 08:54	08/21/13 01:30	7440-50-8	
Lead	**3.2**	mg/L	0.0010	0.00046	10	08/11/13 08:54	08/22/13 00:03	7439-92-1	
Zinc	**13.1**	mg/L	0.25	0.049	50	08/11/13 08:54	08/21/13 01:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0082**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:18	7440-38-2	
Cadmium, Dissolved	**0.0020**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:18	7440-43-9	
Copper, Dissolved	**0.086**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:18	7440-50-8	
Lead, Dissolved	**0.0055**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:18	7439-92-1	
Zinc, Dissolved	**0.55**	mg/L	0.025	0.0049	5	08/09/13 16:48	08/26/13 14:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0010**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:52	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:16	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**4800**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**38.1**	mg/L	5.0	2.5	2		08/07/13 15:36	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0589-080113 **Lab ID: 10237680047** Collected: 08/04/13 09:45 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 01:55	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/22/13 00:08	7440-43-9	
Copper	**0.21**	mg/L	0.00050	0.00017	1	08/11/13 08:54	08/21/13 01:55	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	08/11/13 08:54	08/22/13 00:08	7439-92-1	
Zinc	**0.47**	mg/L	0.025	0.0049	5	08/11/13 08:54	08/21/13 02:00	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0091**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:22	7440-38-2	
Cadmium, Dissolved	**0.00028**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:22	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:22	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:22	7439-92-1	
Zinc, Dissolved	**0.021**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00042**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:55	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**396**	mg/L	20.0	10.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.8**	mg/L	2.5	1.2	1		08/07/13 15:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0590-080113 **Lab ID: 10237680048** Collected: 08/04/13 09:49 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.054**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 02:04	7440-38-2	
Cadmium	**0.0034**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 02:04	7440-43-9	
Copper	**0.52**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 02:09	7440-50-8	
Lead	**0.49**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 00:13	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	08/11/13 08:54	08/21/13 02:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0086**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:27	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:27	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:27	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:27	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 10:57	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:21	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1460**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.8**	mg/L	2.5	1.2	1		08/07/13 15:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0591-080113 **Lab ID: 10237680049** Collected: 08/04/13 09:52 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.067**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 02:14	7440-38-2	
Cadmium	**0.0051**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 02:14	7440-43-9	
Copper	**0.67**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 02:20	7440-50-8	
Lead	**0.69**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 00:18	7439-92-1	
Zinc	**2.1**	mg/L	0.025	0.0049	5	08/11/13 08:54	08/21/13 02:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0084**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:32	7440-38-2	
Cadmium, Dissolved	**0.00022**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:32	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:32	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:32	7439-92-1	
Zinc, Dissolved	**0.016**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:00	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:23	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**848**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.5**	mg/L	2.5	1.2	1		08/07/13 15:28	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0592-080113 **Lab ID: 10237680050** Collected: 08/04/13 09:55 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 02:25	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/22/13 00:22	7440-43-9	
Copper	**0.00026J**	mg/L	0.00050	0.00017	1	08/11/13 08:54	08/21/13 02:25	7440-50-8	
Lead	**0.000060J**	mg/L	0.00010	0.000046	1	08/11/13 08:54	08/22/13 18:37	7439-92-1	
Zinc	**0.0021J**	mg/L	0.0050	0.00098	1	08/11/13 08:54	08/21/13 02:25	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:36	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:36	7440-43-9	
Copper, Dissolved	**0.00037J**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:36	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:36	7439-92-1	
Zinc, Dissolved	**0.0023J**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:07	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:31	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		08/07/13 15:29	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0593-080113 **Lab ID: 10237680051** Collected: 08/04/13 09:58 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.14**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 02:34	7440-38-2	
Cadmium	**0.0082**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 02:34	7440-43-9	
Copper	**1.2**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 02:56	7440-50-8	M1
Lead	**1.2**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 00:27	7439-92-1	M1
Zinc	**3.1**	mg/L	0.050	0.0098	10	08/11/13 08:54	08/21/13 03:01	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0098**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 02:41	7440-38-2	
Cadmium, Dissolved	**0.00030**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 02:41	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 02:41	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 02:41	7439-92-1	
Zinc, Dissolved	**0.021**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 02:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0020**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:10	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:33	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1580**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.4**	mg/L	2.5	1.2	1		08/07/13 15:29	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0594-080113 **Lab ID: 10237680052** Collected: 08/04/13 10:02 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.18**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 03:06	7440-38-2	
Cadmium	**0.011**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 03:06	7440-43-9	
Copper	**1.7**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 03:12	7440-50-8	
Lead	**1.4**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 00:32	7439-92-1	
Zinc	**3.6**	mg/L	0.050	0.0098	10	08/11/13 08:54	08/21/13 03:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:12	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:12	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:12	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:12	7439-92-1	
Zinc, Dissolved	**0.020**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0024**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:12	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:36	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2280**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.7**	mg/L	2.5	1.2	1		08/07/13 15:29	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0595-080113 **Lab ID: 10237680053** Collected: 08/04/13 10:08 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.087**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 03:22	7440-38-2	
Cadmium	**0.0083**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 03:22	7440-43-9	
Copper	**0.68**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 03:27	7440-50-8	
Lead	**0.88**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 00:38	7439-92-1	
Zinc	**3.2**	mg/L	0.050	0.0098	10	08/11/13 08:54	08/21/13 03:32	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0067**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:17	7440-38-2	
Cadmium, Dissolved	**0.00010**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:17	7440-43-9	
Copper, Dissolved	**0.019**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:17	7440-50-8	
Lead, Dissolved	**0.0041**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:17	7439-92-1	
Zinc, Dissolved	**0.019**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00036**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:14	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2920**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**2.2J**	mg/L	2.5	1.2	1		08/07/13 15:29	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0596-080113 **Lab ID: 10237680054** Collected: 08/04/13 10:13 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.22**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 03:37	7440-38-2	
Cadmium	**0.036**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 03:37	7440-43-9	
Copper	**2.2**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 04:04	7440-50-8	
Lead	**3.1**	mg/L	0.0010	0.00046	10	08/11/13 08:54	08/22/13 00:43	7439-92-1	
Zinc	**14.0**	mg/L	0.25	0.049	50	08/11/13 08:54	08/21/13 04:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:21	7440-38-2	
Cadmium, Dissolved	**0.00043**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:21	7440-43-9	
Copper, Dissolved	**0.029**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:21	7440-50-8	
Lead, Dissolved	**0.0072**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:21	7439-92-1	
Zinc, Dissolved	**0.092**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00055**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:17	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**8450**	mg/L	50.0	25.0	1		08/08/13 11:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.1**	mg/L	2.5	1.2	1		08/07/13 15:31	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0597-080113 **Lab ID: 10237680055** Collected: 08/04/13 10:21 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.90**	mg/L	0.010	0.0019	20	08/11/13 08:54	08/21/13 04:20	7440-38-2	
Cadmium	**0.11**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 04:14	7440-43-9	
Copper	**11.4**	mg/L	0.050	0.017	100	08/11/13 08:54	08/21/13 04:25	7440-50-8	
Lead	**8.1**	mg/L	0.0020	0.00092	20	08/11/13 08:54	08/22/13 01:10	7439-92-1	
Zinc	**47.3**	mg/L	1.0	0.20	200	08/11/13 08:54	08/22/13 01:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0033**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:26	7440-38-2	
Cadmium, Dissolved	**0.037**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:26	7440-43-9	
Copper, Dissolved	**0.086**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:26	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:26	7439-92-1	
Zinc, Dissolved	**11.3**	mg/L	0.25	0.049	50	08/09/13 16:48	08/26/13 14:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0037**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:19	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:43	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0598-080113 **Lab ID: 10237680056** Collected: 08/04/13 10:23 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.47**	mg/L	0.010	0.0019	20	08/11/13 08:54	08/21/13 04:36	7440-38-2	
Cadmium	**0.064**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 04:30	7440-43-9	
Copper	**7.8**	mg/L	0.010	0.0035	20	08/11/13 08:54	08/21/13 04:36	7440-50-8	
Lead	**4.3**	mg/L	0.0020	0.00092	20	08/11/13 08:54	08/22/13 01:20	7439-92-1	
Zinc	**24.9**	mg/L	0.50	0.098	100	08/11/13 08:54	08/21/13 04:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0096**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:31	7440-38-2	
Cadmium, Dissolved	**0.0033**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:31	7440-43-9	
Copper, Dissolved	**0.089**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:31	7440-50-8	
Lead, Dissolved	**0.0045**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:31	7439-92-1	
Zinc, Dissolved	**0.71**	mg/L	0.025	0.0049	5	08/09/13 16:48	08/26/13 14:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0022**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:22	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:45	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0599-080113 **Lab ID: 10237680057** Collected: 08/04/13 10:28 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.10**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 04:46	7440-38-2	
Cadmium	**0.013**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 04:46	7440-43-9	
Copper	**1.7**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/21/13 04:51	7440-50-8	
Lead	**0.80**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 01:25	7439-92-1	
Zinc	**5.9**	mg/L	0.10	0.020	20	08/11/13 08:54	08/21/13 05:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0085**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:36	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:36	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:36	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:36	7439-92-1	
Zinc, Dissolved	**0.21**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00054**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:29	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**4060**	mg/L	50.0	25.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.3**	mg/L	2.5	1.2	1		08/07/13 15:31	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0600-080113 **Lab ID: 10237680058** Collected: 08/04/13 10:32 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.11**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 05:16	7440-38-2	
Cadmium	**0.013**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 05:16	7440-43-9	
Copper	**1.3**	mg/L	0.0025	0.00087	5	08/11/13 08:54	08/22/13 18:42	7440-50-8	
Lead	**1.1**	mg/L	0.00050	0.00023	5	08/11/13 08:54	08/22/13 18:42	7439-92-1	
Zinc	**3.8**	mg/L	0.10	0.020	20	08/11/13 08:54	08/22/13 01:35	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0044**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:40	7440-38-2	
Cadmium, Dissolved	**0.000074J**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:40	7440-43-9	
Copper, Dissolved	**0.041**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:40	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:40	7439-92-1	
Zinc, Dissolved	**0.011**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00053**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:55	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0601-080113 **Lab ID: 10237680059** Collected: 08/04/13 10:39 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.44**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 05:32	7440-38-2	
Cadmium	**0.043**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 05:32	7440-43-9	
Copper	**6.2**	mg/L	0.010	0.0035	20	08/11/13 08:54	08/21/13 05:38	7440-50-8	
Lead	**3.9**	mg/L	0.0010	0.00046	10	08/11/13 08:54	08/22/13 01:40	7439-92-1	
Zinc	**20.7**	mg/L	0.25	0.049	50	08/11/13 08:54	08/21/13 05:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.022**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:45	7440-38-2	
Cadmium, Dissolved	**0.00042**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:45	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:45	7440-50-8	
Lead, Dissolved	**0.0038**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:45	7439-92-1	
Zinc, Dissolved	**0.20**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0073**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:34	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 12:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**17700**	mg/L	200	100	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**39.8**	mg/L	5.0	2.5	2		08/07/13 15:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0602-080113 **Lab ID: 10237680060** Collected: 08/04/13 10:45 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.26**	mg/L	0.00050	0.000093	1	08/11/13 08:54	08/21/13 05:47	7440-38-2	
Cadmium	**0.039**	mg/L	0.000080	0.000032	1	08/11/13 08:54	08/21/13 05:47	7440-43-9	
Copper	**3.8**	mg/L	0.0050	0.0017	10	08/11/13 08:54	08/21/13 05:53	7440-50-8	
Lead	**3.2**	mg/L	0.0010	0.00046	10	08/11/13 08:54	08/22/13 01:45	7439-92-1	
Zinc	**14.8**	mg/L	0.25	0.049	50	08/11/13 08:54	08/21/13 05:58	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	08/09/13 16:48	08/23/13 03:50	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	08/09/13 16:48	08/23/13 03:50	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	08/09/13 16:48	08/23/13 03:50	7440-50-8	
Lead, Dissolved	**0.0043**	mg/L	0.00010	0.000046	1	08/09/13 16:48	08/23/13 03:50	7439-92-1	
Zinc, Dissolved	**0.048**	mg/L	0.0050	0.00098	1	08/09/13 16:48	08/23/13 03:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0018**	mg/L	0.00020	0.000030	1	08/11/13 13:19	08/14/13 11:37	7439-97-6	M1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/10/13 06:58	08/14/13 13:00	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11100**	mg/L	200	100	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.0**	mg/L	2.5	1.2	1		08/07/13 15:31	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0603-080113 **Lab ID: 10237680061** Collected: 08/04/13 10:49 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.68**	mg/L	0.025	0.0046	50	08/12/13 11:02	08/26/13 11:21	7440-38-2	M1
Cadmium	**0.048**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 11:19	7440-43-9	
Copper	**12.2**	mg/L	0.025	0.0087	50	08/12/13 11:02	08/26/13 11:21	7440-50-8	M1
Lead	**3.5**	mg/L	0.0050	0.0023	50	08/12/13 11:02	08/26/13 11:21	7439-92-1	M1
Zinc	**12.9**	mg/L	0.25	0.049	50	08/12/13 11:02	08/26/13 11:21	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.063**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 22:53	7440-38-2	
Cadmium, Dissolved	**0.00049**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 22:53	7440-43-9	
Copper, Dissolved	**0.060**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 22:53	7440-50-8	
Lead, Dissolved	**0.011**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 22:53	7439-92-1	
Zinc, Dissolved	**0.037**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 22:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0023**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:17	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 14:41	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0604-080113 **Lab ID: 10237680062** Collected: 08/04/13 12:13 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.028**	mg/L	0.0010	0.00019	2	08/12/13 11:02	08/26/13 11:38	7440-38-2	
Cadmium	**0.0021**	mg/L	0.00016	0.000064	2	08/12/13 11:02	08/26/13 11:38	7440-43-9	
Copper	**0.18**	mg/L	0.0010	0.00035	2	08/12/13 11:02	08/26/13 11:38	7440-50-8	
Lead	**0.27**	mg/L	0.00020	0.000092	2	08/12/13 11:02	08/26/13 11:38	7439-92-1	
Zinc	**0.61**	mg/L	0.010	0.0020	2	08/12/13 11:02	08/26/13 11:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0082**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 22:58	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 22:58	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 22:58	7440-50-8	
Lead, Dissolved	**0.0034**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 22:58	7439-92-1	
Zinc, Dissolved	**0.029**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 22:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0011**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 14:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**306**	mg/L	20.0	10.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.0**	mg/L	2.5	1.2	1		08/07/13 15:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0605-080113 **Lab ID: 10237680063** Collected: 08/04/13 12:17 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.0010	0.00019	2	08/12/13 11:02	08/26/13 11:41	7440-38-2	
Cadmium	**0.0023**	mg/L	0.00016	0.000064	2	08/12/13 11:02	08/26/13 11:41	7440-43-9	
Copper	**0.19**	mg/L	0.0010	0.00035	2	08/12/13 11:02	08/26/13 11:41	7440-50-8	
Lead	**0.28**	mg/L	0.00020	0.000092	2	08/12/13 11:02	08/26/13 11:41	7439-92-1	
Zinc	**0.64**	mg/L	0.010	0.0020	2	08/12/13 11:02	08/26/13 11:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0086**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 23:12	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 23:12	7440-43-9	
Copper, Dissolved	**0.038**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 23:12	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 23:12	7439-92-1	
Zinc, Dissolved	**0.033**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 23:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 14:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**310**	mg/L	50.0	25.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.3**	mg/L	2.5	1.2	1		08/07/13 15:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0606-080113 **Lab ID: 10237680064** Collected: 08/04/13 12:21 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.030**	mg/L	0.0010	0.00019	2	08/12/13 11:02	08/26/13 11:43	7440-38-2	
Cadmium	**0.0022**	mg/L	0.00016	0.000064	2	08/12/13 11:02	08/26/13 11:43	7440-43-9	
Copper	**0.20**	mg/L	0.0010	0.00035	2	08/12/13 11:02	08/26/13 11:43	7440-50-8	
Lead	**0.28**	mg/L	0.00020	0.000092	2	08/12/13 11:02	08/26/13 11:43	7439-92-1	
Zinc	**0.66**	mg/L	0.010	0.0020	2	08/12/13 11:02	08/26/13 11:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0090**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 23:02	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 23:02	7440-43-9	
Copper, Dissolved	**0.042**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 23:02	7440-50-8	
Lead, Dissolved	**0.0036**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 23:02	7439-92-1	
Zinc, Dissolved	**0.041**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 23:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:35	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 14:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**277**	mg/L	50.0	25.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.3**	mg/L	2.5	1.2	1		08/07/13 15:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0607-080113 **Lab ID: 10237680065** Collected: 08/04/13 12:25 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.030**	mg/L	0.0010	0.00019	2	08/12/13 11:02	08/26/13 11:46	7440-38-2	
Cadmium	**0.0024**	mg/L	0.00016	0.000064	2	08/12/13 11:02	08/26/13 11:46	7440-43-9	
Copper	**0.20**	mg/L	0.0010	0.00035	2	08/12/13 11:02	08/26/13 11:46	7440-50-8	
Lead	**0.27**	mg/L	0.00020	0.000092	2	08/12/13 11:02	08/26/13 11:46	7439-92-1	
Zinc	**0.66**	mg/L	0.010	0.0020	2	08/12/13 11:02	08/26/13 11:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0099**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 23:07	7440-38-2	
Cadmium, Dissolved	**0.00048**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 23:07	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 23:07	7440-50-8	
Lead, Dissolved	**0.0043**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 23:07	7439-92-1	
Zinc, Dissolved	**0.054**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 23:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:37	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:01	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**283**	mg/L	20.0	10.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.2**	mg/L	2.5	1.2	1		08/07/13 15:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0608-080113 **Lab ID: 10237680066** Collected: 08/04/13 12:28 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.0010	0.00019	2	08/12/13 11:02	08/26/13 11:49	7440-38-2	
Cadmium	**0.0024**	mg/L	0.00016	0.000064	2	08/12/13 11:02	08/26/13 11:49	7440-43-9	
Copper	**0.20**	mg/L	0.0010	0.00035	2	08/12/13 11:02	08/26/13 11:49	7440-50-8	
Lead	**0.27**	mg/L	0.00020	0.000092	2	08/12/13 11:02	08/26/13 11:49	7439-92-1	
Zinc	**0.69**	mg/L	0.010	0.0020	2	08/12/13 11:02	08/26/13 11:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0095**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 23:49	7440-38-2	
Cadmium, Dissolved	**0.00049**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 23:49	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 23:49	7440-50-8	
Lead, Dissolved	**0.0040**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 23:49	7439-92-1	
Zinc, Dissolved	**0.055**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 23:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:40	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**290**	mg/L	50.0	25.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.1**	mg/L	2.5	1.2	1		08/07/13 15:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0609-080113 **Lab ID: 10237680067** Collected: 08/04/13 12:32 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.032**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 11:51	7440-38-2	
Cadmium	**0.0047**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 11:51	7440-43-9	
Copper	**0.29**	mg/L	0.00050	0.00017	1	08/12/13 11:02	08/26/13 11:51	7440-50-8	
Lead	**0.29**	mg/L	0.00010	0.000046	1	08/12/13 11:02	08/26/13 11:51	7439-92-1	
Zinc	**1.2**	mg/L	0.025	0.0049	5	08/12/13 11:02	08/26/13 11:54	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0095**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 23:53	7440-38-2	
Cadmium, Dissolved	**0.00060**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 23:53	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 23:53	7440-50-8	
Lead, Dissolved	**0.0039**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 23:53	7439-92-1	
Zinc, Dissolved	**0.070**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 23:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:42	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:06	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**319**	mg/L	50.0	25.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.9**	mg/L	2.5	1.2	1		08/07/13 15:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0610-080113 **Lab ID: 10237680068** Collected: 08/04/13 12:35 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.032**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 11:57	7440-38-2	
Cadmium	**0.0046**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 11:57	7440-43-9	
Copper	**0.28**	mg/L	0.00050	0.00017	1	08/12/13 11:02	08/26/13 11:57	7440-50-8	
Lead	**0.28**	mg/L	0.00010	0.000046	1	08/12/13 11:02	08/26/13 11:57	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	08/12/13 11:02	08/26/13 12:24	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0092**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/22/13 23:58	7440-38-2	
Cadmium, Dissolved	**0.00066**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/22/13 23:58	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/22/13 23:58	7440-50-8	
Lead, Dissolved	**0.0037**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/22/13 23:58	7439-92-1	
Zinc, Dissolved	**0.070**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/22/13 23:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0016**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:08	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**307**	mg/L	50.0	25.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.0**	mg/L	2.5	1.2	1		08/07/13 15:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0611-080113 **Lab ID: 10237680069** Collected: 08/04/13 12:38 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 12:27	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 12:27	7440-43-9	
Copper	**0.00049J**	mg/L	0.00050	0.00017	1	08/12/13 11:02	08/26/13 12:27	7440-50-8	
Lead	**0.00029**	mg/L	0.00010	0.000046	1	08/12/13 11:02	08/26/13 12:27	7439-92-1	
Zinc	**0.0024J**	mg/L	0.0050	0.00098	1	08/12/13 11:02	08/26/13 12:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 00:22	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 00:22	7440-43-9	
Copper, Dissolved	**0.00044J**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 00:22	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 00:22	7439-92-1	
Zinc, Dissolved	**0.0016J**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 00:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 13:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:11	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/08/13 14:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		08/07/13 15:58	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0617-080113 **Lab ID: 10237680075** Collected: 08/05/13 12:10 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.62**	mg/L	0.025	0.0046	50	08/12/13 11:02	08/26/13 11:05	7440-38-2	
Cadmium	**0.057**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 11:03	7440-43-9	
Copper	**12.6**	mg/L	0.025	0.0087	50	08/12/13 11:02	08/26/13 11:05	7440-50-8	
Lead	**5.7**	mg/L	0.0050	0.0023	50	08/12/13 11:02	08/26/13 11:05	7439-92-1	
Zinc	**15.7**	mg/L	0.25	0.049	50	08/12/13 11:02	08/26/13 11:05	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.031**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 00:03	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 00:03	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 00:03	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 00:03	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 00:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0019**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 14:07	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**7570**	mg/L	200	100	1		08/12/13 10:56		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**37.3**	mg/L	5.0	2.5	2		08/07/13 16:06	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0618-080113 **Lab ID: 10237680076** Collected: 08/05/13 12:16 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.41**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 11:08	7440-38-2	
Cadmium	**0.041**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 11:08	7440-43-9	
Copper	**7.4**	mg/L	0.025	0.0087	50	08/12/13 11:02	08/26/13 11:11	7440-50-8	
Lead	**4.0**	mg/L	0.0050	0.0023	50	08/12/13 11:02	08/26/13 11:11	7439-92-1	
Zinc	**11.3**	mg/L	0.25	0.049	50	08/12/13 11:02	08/26/13 11:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.034**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 00:08	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 00:08	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 00:08	7440-50-8	
Lead, Dissolved	**0.0028**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 00:08	7439-92-1	
Zinc, Dissolved	**0.026**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 00:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0029**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 14:09	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:33	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**6850**	mg/L	200	100	1		08/12/13 10:56		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**36.1**	mg/L	5.0	2.5	2		08/07/13 16:09	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0619-080113 **Lab ID: 10237680077** Collected: 08/05/13 12:22 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.31**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 11:13	7440-38-2	
Cadmium	**0.026**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 11:13	7440-43-9	
Copper	**4.8**	mg/L	0.025	0.0087	50	08/12/13 11:02	08/26/13 11:16	7440-50-8	
Lead	**2.5**	mg/L	0.0050	0.0023	50	08/12/13 11:02	08/26/13 11:16	7439-92-1	
Zinc	**7.2**	mg/L	0.25	0.049	50	08/12/13 11:02	08/26/13 11:16	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.032**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 00:13	7440-38-2	
Cadmium, Dissolved	**0.000088**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 00:13	7440-43-9	
Copper, Dissolved	**0.019**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 00:13	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 00:13	7439-92-1	
Zinc, Dissolved	**0.029**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 00:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0026**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 14:16	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**4840**	mg/L	200	100	1		08/12/13 10:56		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**35.3**	mg/L	5.0	2.5	2		08/07/13 16:09	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0620-080113 **Lab ID: 10237680078** Collected: 08/05/13 12:26 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.21**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 12:08	7440-38-2	
Cadmium	**0.016**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 12:08	7440-43-9	
Copper	**2.9**	mg/L	0.010	0.0035	20	08/12/13 11:02	08/26/13 12:10	7440-50-8	
Lead	**1.3**	mg/L	0.0020	0.00092	20	08/12/13 11:02	08/26/13 12:10	7439-92-1	
Zinc	**4.2**	mg/L	0.10	0.020	20	08/12/13 11:02	08/26/13 12:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.030**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 00:17	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 00:17	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 00:17	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 00:17	7439-92-1	
Zinc, Dissolved	**0.036**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 00:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 14:19	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2410**	mg/L	200	100	1		08/12/13 10:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**38.1**	mg/L	5.0	2.5	2		08/07/13 16:09	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0621-080113 **Lab ID: 10237680079** Collected: 08/05/13 12:30 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.23**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 12:13	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 12:13	7440-43-9	
Copper	**3.7**	mg/L	0.0050	0.0017	10	08/12/13 11:02	08/26/13 12:16	7440-50-8	
Lead	**1.6**	mg/L	0.0010	0.00046	10	08/12/13 11:02	08/26/13 12:16	7439-92-1	
Zinc	**5.0**	mg/L	0.10	0.020	20	08/12/13 11:02	08/28/13 14:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.029**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 01:02	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 01:02	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 01:02	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 01:02	7439-92-1	
Zinc, Dissolved	**0.031**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 01:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0016**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 14:21	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:45	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1790**	mg/L	200	100	1		08/12/13 10:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**38.7**	mg/L	5.0	2.5	2		08/07/13 16:09	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Sample: SD0622-080113 **Lab ID: 10237680080** Collected: 08/05/13 12:34 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.36**	mg/L	0.00050	0.000093	1	08/12/13 11:02	08/26/13 12:19	7440-38-2	
Cadmium	**0.040**	mg/L	0.000080	0.000032	1	08/12/13 11:02	08/26/13 12:19	7440-43-9	
Copper	**7.0**	mg/L	0.025	0.0087	50	08/12/13 11:02	08/26/13 12:21	7440-50-8	
Lead	**3.7**	mg/L	0.0050	0.0023	50	08/12/13 11:02	08/26/13 12:21	7439-92-1	
Zinc	**10.8**	mg/L	0.25	0.049	50	08/12/13 11:02	08/26/13 12:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.021**	mg/L	0.00050	0.000093	1	08/09/13 16:42	08/23/13 01:07	7440-38-2	
Cadmium, Dissolved	**0.00015**	mg/L	0.000080	0.000032	1	08/09/13 16:42	08/23/13 01:07	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	08/09/13 16:42	08/23/13 01:07	7440-50-8	
Lead, Dissolved	**0.0034**	mg/L	0.00010	0.000046	1	08/09/13 16:42	08/23/13 01:07	7439-92-1	
Zinc, Dissolved	**0.027**	mg/L	0.0050	0.00098	1	08/09/13 16:42	08/23/13 01:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0023**	mg/L	0.00020	0.000030	1	08/12/13 11:04	08/14/13 14:24	7439-97-6	M1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	08/12/13 11:05	08/14/13 15:48	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**6830**	mg/L	200	100	1		08/12/13 10:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.1**	mg/L	2.5	1.2	1		08/07/13 16:01	14808-79-8	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9000 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

METHOD BLANK: 1495604 — Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/13/13 11:19	

LABORATORY CONTROL SAMPLE: 1495605

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0055	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495606 — 1495607

Parameter	Units	10237680002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0053	0.0053	106	106	85-115	.4	20	

MATRIX SPIKE SAMPLE: 1495608

Parameter	Units	10237680020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0051	101	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9002 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

METHOD BLANK: 1495617 — Matrix: Water
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/14/13 10:20	

LABORATORY CONTROL SAMPLE: 1495618

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0044	89	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495619 1495620

Parameter	Units	10237680042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.0014	.005	.005	0.0040	0.0042	54	56	85-115	3	20	M1

MATRIX SPIKE SAMPLE: 1495621

Parameter	Units	10237680060 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0018	.005	0.0044	52	85-115	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9003 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

METHOD BLANK: 1495622 Matrix: Water
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/14/13 13:12	

LABORATORY CONTROL SAMPLE: 1495623

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495624 1495625

Parameter	Units	10237680062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.0011	.005	.005	0.0060	0.0063	98	105	85-115	5	20	

MATRIX SPIKE SAMPLE: 1495626

Parameter	Units	10237680080 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0023	.005	0.0049	52	85-115	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9065 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

METHOD BLANK: 1502907 — Matrix: Water
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/16/13 07:24	

LABORATORY CONTROL SAMPLE: 1502908

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1502909 1502910

Parameter	Units	10237680024 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00026	.005	.005	0.0056	0.0054	106	102	85-115	3	20	

MATRIX SPIKE SAMPLE: 1502911

Parameter	Units	10237680039 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00014J	.005	0.0054	105	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9004 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

METHOD BLANK: 1495627 — Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	08/13/13 12:45	

LABORATORY CONTROL SAMPLE: 1495628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495629 1495630

Parameter	Units	10237680002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0049	0.0051	98	103	85-115	5	20	

MATRIX SPIKE SAMPLE: 1495631

Parameter	Units	10237680020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0049	98	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9005 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

METHOD BLANK: 1495632 — Matrix: Water
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	08/13/13 14:24	

LABORATORY CONTROL SAMPLE: 1495633

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495634 — 1495635

Parameter	Units	10237680022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0052	0.0050	104	99	85-115	5	20	

MATRIX SPIKE SAMPLE: 1495636

Parameter	Units	10237680040 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0056	112	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9006 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

METHOD BLANK: 1495639 — Matrix: Water
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	08/14/13 11:49	

LABORATORY CONTROL SAMPLE: 1495640

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495641 — 1495642

Parameter	Units	10237680042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0052	0.0052	104	105	85-115	.6	20	

MATRIX SPIKE SAMPLE: 1495643

Parameter	Units	10237680060 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0052	104	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MERP/9007 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

METHOD BLANK: 1495650 | Matrix: Water
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	08/14/13 14:36	

LABORATORY CONTROL SAMPLE: 1495651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0048	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495652 1495653

Parameter	Units	10237680062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0051	0.0051	102	102	85-115	.4	20	

MATRIX SPIKE SAMPLE: 1495654

Parameter	Units	10237680080 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0048	97	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41079 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

METHOD BLANK: 1495406 Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	08/22/13 02:15	
Cadmium	mg/L	ND	0.000080	08/22/13 02:15	
Calcium	ug/L	ND	20.0	08/22/13 02:15	
Copper	mg/L	ND	0.00050	08/22/13 02:15	
Iron	ug/L	ND	50.0	08/22/13 02:15	
Lead	mg/L	ND	0.00010	08/22/13 02:15	
Magnesium	ug/L	2.4J	5.0	08/22/13 02:15	
Manganese	ug/L	ND	0.50	08/22/13 02:15	
Potassium	ug/L	ND	20.0	08/22/13 02:15	
Sodium	ug/L	ND	50.0	08/22/13 02:15	
Zinc	mg/L	ND	0.0050	08/22/13 02:15	

LABORATORY CONTROL SAMPLE: 1495407

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.083	103	85-115	
Calcium	ug/L	1000	1080	108	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	ug/L	1000	1040	104	85-115	
Lead	mg/L	.08	0.081	102	85-115	
Magnesium	ug/L	1000	1070	107	85-115	
Manganese	ug/L	80	83.1	104	85-115	
Potassium	ug/L	1000	1010	101	85-115	
Sodium	ug/L	1000	1000	100	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495408 1495409

Parameter	Units	10237680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.016	.08	.08	0.094	0.094	98	98	70-130	.04	20	
Cadmium	mg/L	0.00039	.08	.08	0.074	0.075	92	93	70-130	1	20	
Calcium	ug/L	26600	1000	1000	27000	27500	106	152	70-130	2	20	
Copper	mg/L	0.11	.08	.08	0.19	0.19	102	103	70-130	.8	20	
Iron	ug/L	745	1000	1000	2170	2160	121	120	70-130	.6	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495408 1495409

Parameter	Units	10237680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.014	.08	.08	0.090	0.092	95	98	70-130	3	20	
Magnesium	ug/L	8340	1000	1000	9110	9130	119	120	70-130	.2	20	
Manganese	ug/L	75.2	80	80	162	164	96	99	70-130	1	20	
Potassium	ug/L	5590	1000	1000	6520	6640	126	138	70-130	2	20	
Sodium	ug/L	6220	1000	1000	6950	7040	114	122	70-130	1	20	
Zinc	mg/L	0.062	.08	.08	0.13	0.13	83	83	70-130	.1	20	

MATRIX SPIKE SAMPLE: 1495410

Parameter	Units	10237680011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.019	.08	0.097	97	70-130	
Cadmium	mg/L	0.00054	.08	0.076	94	70-130	
Calcium	ug/L	13000	1000	16200	96	70-130	
Copper	mg/L	0.26	.08	0.35	110	70-130	
Iron	ug/L	104	1000	7270	177	70-130	
Lead	mg/L	0.043	.08	0.11	88	70-130	
Magnesium	ug/L	2340	1000	5500	117	70-130	
Manganese	ug/L	17.5	80	298	96	70-130	
Potassium	ug/L	2810	1000	5610	119	70-130	
Sodium	ug/L	3750	1000	5050	98	70-130	
Zinc	mg/L	0.15	.08	0.22	91	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41080 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

METHOD BLANK: 1495411 Matrix: Water
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	08/23/13 10:11	
Cadmium	mg/L	ND	0.000080	08/23/13 10:11	
Calcium	ug/L	ND	20.0	08/23/13 10:11	
Copper	mg/L	ND	0.00050	08/23/13 10:11	
Iron	ug/L	ND	50.0	08/23/13 10:11	
Lead	mg/L	ND	0.00010	08/23/13 10:11	
Magnesium	ug/L	ND	5.0	08/23/13 10:11	
Manganese	ug/L	ND	0.50	08/23/13 10:11	
Potassium	ug/L	ND	20.0	08/23/13 10:11	
Sodium	ug/L	ND	50.0	08/23/13 10:11	ES
Zinc	mg/L	ND	0.0050	08/23/13 10:11	

LABORATORY CONTROL SAMPLE: 1495412

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.082	102	85-115	
Cadmium	mg/L	.08	0.084	105	85-115	
Calcium	ug/L	1000	924	92	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	ug/L	1000	1090	109	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	ug/L	1000	1030	103	85-115	
Manganese	ug/L	80	78.7	98	85-115	
Potassium	ug/L	1000	979	98	85-115	
Sodium	ug/L	1000	1040	104	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495413 1495414

Parameter	Units	10237680021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.071	.08	.08	0.15	0.15	95	98	70-130	2	20	
Cadmium	mg/L	0.0061	.08	.08	0.086	0.089	100	104	70-130	3	20	
Calcium	ug/L	53200	1000	1000	52900	55300	-35	210	70-130	5	20	
Copper	mg/L	1.8	.08	.08	1.7	1.8	-66	-38	70-130	1	20	M1
Iron	ug/L	30500	1000	1000	30800	29400	30	-109	70-130	5	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495413 1495414

Parameter	Units	10237680021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.47	.08	.08	0.54	0.55	95	102	70-130	1	20	
Magnesium	ug/L	18600	1000	1000	18400	18700	-15	10	70-130	1	20	
Manganese	ug/L	1710	80	80	1690	1700	-20	-8	70-130	.6	20	
Potassium	ug/L	13000	1000	1000	13900	13600	90	63	70-130	2	20	
Sodium	ug/L	5960	1000	1000	6980	7190	102	123	70-130	3	20	ES
Zinc	mg/L	1.8	.08	.08	1.8	1.8	-6	58	70-130	3	20	M1

MATRIX SPIKE SAMPLE: 1495415

Parameter	Units	10237680031 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.037	.08	0.021	-21	70-130	M1
Cadmium	mg/L	0.0034	.08	0.017	17	70-130	M1
Calcium	ug/L	32100	1000	6730	-2540	70-130	
Copper	mg/L	0.30	.08	0.074	-287	70-130	M1
Iron	ug/L	10800	1000	2660	-815	70-130	
Lead	mg/L	0.39	.08	0.11	-354	70-130	M1
Magnesium	ug/L	8330	1000	1980	-634	70-130	
Manganese	ug/L	919	80	194	-906	70-130	
Potassium	ug/L	5860	1000	1290	-457	70-130	
Sodium	ug/L	4820	1000	1240	-358	70-130	ES
Zinc	mg/L	1.6	.08	0.30	-1590	70-130	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41081 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

METHOD BLANK: 1495416 Matrix: Water
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	08/20/13 23:34	
Cadmium	mg/L	ND	0.000080	08/21/13 22:54	
Copper	mg/L	ND	0.00050	08/21/13 22:54	
Lead	mg/L	ND	0.00010	08/21/13 22:54	
Zinc	mg/L	0.0019J	0.0050	08/20/13 23:34	

LABORATORY CONTROL SAMPLE: 1495417

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.084	104	85-115	
Cadmium	mg/L	.08	0.076	96	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Lead	mg/L	.08	0.078	97	85-115	
Zinc	mg/L	.08	0.081	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495418 1495419

Parameter	Units	10237680041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.089	.08	.08	0.17	0.17	97	96	70-130	.6	20	
Cadmium	mg/L	0.0055	.08	.08	0.080	0.078	94	91	70-130	3	20	
Copper	mg/L	1.6	.08	.08	1.7	1.7	48	16	70-130	2	20	E,M1
Lead	mg/L	0.43	.08	.08	0.54	0.52	136	113	70-130	4	20	M1
Zinc	mg/L	1.4	.08	.08	1.4	1.4	87	70	70-130	1	20	E

MATRIX SPIKE SAMPLE: 1495420

Parameter	Units	10237680051 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.14	.08	0.22	97	70-130	
Cadmium	mg/L	0.0082	.08	0.076	85	70-130	
Copper	mg/L	1.2	.08	1.2	56	70-130	E,M1
Lead	mg/L	1.2	.08	1.2	-2	70-130	E,M1
Zinc	mg/L	3.1	.08	2.6	-594	70-130	E,M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41082 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

METHOD BLANK: 1495428 Matrix: Water
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	08/26/13 13:18	
Cadmium	mg/L	ND	0.000080	08/26/13 13:18	
Copper	mg/L	ND	0.00050	08/26/13 13:18	
Lead	mg/L	0.000053J	0.00010	08/26/13 13:18	
Zinc	mg/L	ND	0.0050	08/26/13 13:18	

LABORATORY CONTROL SAMPLE: 1495429

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.079	98	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Copper	mg/L	.08	0.081	101	85-115	
Lead	mg/L	.08	0.081	102	85-115	
Zinc	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495430 1495431

Parameter	Units	10237680061 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.68	.08	.08	0.73	0.70	65	32	70-130	4	20	M1
Cadmium	mg/L	0.048	.08	.08	0.13	0.13	105	105	70-130	.5	20	
Copper	mg/L	12.2	.08	.08	11.2	10.9	-1250	-1720	70-130	3	20	M1
Lead	mg/L	3.5	.08	.08	3.4	3.3	-121	-313	70-130	5	20	M1
Zinc	mg/L	12.9	.08	.08	13.5	13.0	779	119	70-130	4	20	M1

MATRIX SPIKE SAMPLE: 1495432

Parameter	Units	10240505001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	4.5 ug/L	.08	0.085	100	70-130	
Cadmium	mg/L	5.0 ug/L	.08	0.086	101	70-130	
Copper	mg/L	177 ug/L	.08	0.26	109	70-130	
Lead	mg/L	2.5 ug/L	.08	0.080	97	70-130	
Zinc	mg/L	3440 ug/L	.08	3.5	48	70-130	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41087 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

METHOD BLANK: 1495460 — Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	08/22/13 04:28	
Cadmium, Dissolved	mg/L	ND	0.000080	08/22/13 04:28	
Copper, Dissolved	mg/L	ND	0.00050	08/22/13 04:28	
Lead, Dissolved	mg/L	ND	0.00010	08/22/13 04:28	
Zinc, Dissolved	mg/L	ND	0.0050	08/22/13 04:28	

LABORATORY CONTROL SAMPLE: 1495461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.083	103	85-115	
Cadmium, Dissolved	mg/L	.08	0.081	101	85-115	
Copper, Dissolved	mg/L	.08	0.083	104	85-115	
Lead, Dissolved	mg/L	.08	0.080	100	85-115	
Zinc, Dissolved	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495462 1495463

Parameter	Units	10237680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.015	.08	.08	0.094	0.093	99	97	70-130	1	20	
Cadmium, Dissolved	mg/L	0.00036	.08	.08	0.075	0.075	94	93	70-130	.5	20	
Copper, Dissolved	mg/L	0.092	.08	.08	0.17	0.16	92	89	70-130	2	20	
Lead, Dissolved	mg/L	0.0090	.08	.08	0.085	0.086	95	96	70-130	.5	20	
Zinc, Dissolved	mg/L	0.049	.08	.08	0.11	0.11	80	77	70-130	2	20	

MATRIX SPIKE SAMPLE: 1495464

Parameter	Units	10237680011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0082	.08	0.084	95	70-130	
Cadmium, Dissolved	mg/L	0.000062J	.08	0.074	92	70-130	
Copper, Dissolved	mg/L	0.045	.08	0.12	95	70-130	
Lead, Dissolved	mg/L	0.0010	.08	0.076	94	70-130	
Zinc, Dissolved	mg/L	0.0086	.08	0.073	80	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41088 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

METHOD BLANK: 1495465 — Matrix: Water
Associated Lab Samples: 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	08/26/13 18:59	
Cadmium, Dissolved	mg/L	ND	0.000080	08/26/13 18:59	
Copper, Dissolved	mg/L	ND	0.00050	08/26/13 18:59	
Lead, Dissolved	mg/L	ND	0.00010	08/26/13 18:59	
Zinc, Dissolved	mg/L	ND	0.0050	08/26/13 18:59	

LABORATORY CONTROL SAMPLE: 1495466

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.078	98	85-115	
Cadmium, Dissolved	mg/L	.08	0.085	106	85-115	
Copper, Dissolved	mg/L	.08	0.086	108	85-115	
Lead, Dissolved	mg/L	.08	0.084	105	85-115	
Zinc, Dissolved	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495467 1495468

Parameter	Units	10237680021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0096	.08	.08	0.089	0.090	99	101	70-130	1	20	
Cadmium, Dissolved	mg/L	0.00013	.08	.08	0.086	0.087	108	108	70-130	.7	20	
Copper, Dissolved	mg/L	0.038	.08	.08	0.12	0.12	101	103	70-130	2	20	
Lead, Dissolved	mg/L	0.0015	.08	.08	0.081	0.082	100	100	70-130	.7	20	
Zinc, Dissolved	mg/L	0.018	.08	.08	0.10	0.10	108	109	70-130	1	20	

MATRIX SPIKE SAMPLE: 1495469

Parameter	Units	10237680031 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.012	.08	0.088	95	70-130	
Cadmium, Dissolved	mg/L	0.00060	.08	0.084	104	70-130	
Copper, Dissolved	mg/L	0.051	.08	0.13	96	70-130	
Lead, Dissolved	mg/L	0.0038	.08	0.080	95	70-130	
Zinc, Dissolved	mg/L	0.075	.08	0.15	98	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41089 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

METHOD BLANK: 1495482 — Matrix: Water
Associated Lab Samples: 10237680041, 10237680042, 10237680043, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680055, 10237680056, 10237680057, 10237680058, 10237680059, 10237680060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	08/23/13 01:12	
Cadmium, Dissolved	mg/L	ND	0.000080	08/23/13 01:12	
Copper, Dissolved	mg/L	ND	0.00050	08/23/13 01:12	
Lead, Dissolved	mg/L	ND	0.00010	08/23/13 01:12	
Zinc, Dissolved	mg/L	ND	0.0050	08/23/13 01:12	

LABORATORY CONTROL SAMPLE: 1495483

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.079	99	85-115	
Cadmium, Dissolved	mg/L	.08	0.082	102	85-115	
Copper, Dissolved	mg/L	.08	0.084	104	85-115	
Lead, Dissolved	mg/L	.08	0.079	98	85-115	
Zinc, Dissolved	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1495484 1495485

Parameter	Units	10237680041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.010	.08	.08	0.071	0.094	75	104	70-130	28	20	R1
Cadmium, Dissolved	mg/L	0.00016	.08	.08	0.083	0.081	104	100	70-130	3	20	
Copper, Dissolved	mg/L	0.035	.08	.08	0.12	0.12	106	107	70-130	.8	20	
Lead, Dissolved	mg/L	0.0016	.08	.08	0.082	0.080	100	98	70-130	3	20	
Zinc, Dissolved	mg/L	0.021	.08	.08	0.10	0.10	103	99	70-130	3	20	

MATRIX SPIKE SAMPLE: 1495486

Parameter	Units	10237680051 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0098	.08	0.089	99	70-130	
Cadmium, Dissolved	mg/L	0.00030	.08	0.081	100	70-130	
Copper, Dissolved	mg/L	0.043	.08	0.12	101	70-130	
Lead, Dissolved	mg/L	0.0018	.08	0.078	96	70-130	
Zinc, Dissolved	mg/L	0.021	.08	0.10	100	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: MPRP/41090 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

METHOD BLANK: 1495495 — Matrix: Water
Associated Lab Samples: 10237680061, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	08/22/13 22:42	
Cadmium, Dissolved	mg/L	ND	0.000080	08/22/13 22:42	
Copper, Dissolved	mg/L	ND	0.00050	08/22/13 22:42	
Lead, Dissolved	mg/L	ND	0.00010	08/22/13 22:42	
Zinc, Dissolved	mg/L	ND	0.0050	08/22/13 22:42	

LABORATORY CONTROL SAMPLE: 1495496

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.080	100	85-115	
Cadmium, Dissolved	mg/L	.08	0.080	100	85-115	
Copper, Dissolved	mg/L	.08	0.084	105	85-115	
Lead, Dissolved	mg/L	.08	0.076	96	85-115	
Zinc, Dissolved	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE SAMPLE: 1495499

Parameter	Units	10240505001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	ND	.08	0.084	104	70-130	
Cadmium, Dissolved	mg/L	ND	.08	0.079	99	70-130	
Copper, Dissolved	mg/L	ND	.08	0.14	177	70-130	M1
Lead, Dissolved	mg/L	ND	.08	0.068	85	70-130	
Zinc, Dissolved	mg/L	ND	.08	3.0	3780	70-130	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1499496 — 1499497

Parameter	Units	10237680063 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0086	.08	.08	0.089	0.088	100	100	70-130	.4	20	
Cadmium, Dissolved	mg/L	0.00029	.08	.08	0.083	0.083	104	103	70-130	.5	20	
Copper, Dissolved	mg/L	0.038	.08	.08	0.12	0.12	107	107	70-130	.1	20	
Lead, Dissolved	mg/L	0.0033	.08	.08	0.083	0.081	99	97	70-130	2	20	
Zinc, Dissolved	mg/L	0.033	.08	.08	0.11	0.11	98	98	70-130	.4	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/33876 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10237680008, 10237680009, 10237680036

METHOD BLANK: 1604009 — Matrix: Water
Associated Lab Samples: 10237680008, 10237680009, 10237680036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 — 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 — 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 — 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/31664 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012

METHOD BLANK: 1496120 — Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/07/13 09:52	

METHOD BLANK: 1496124 — Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/07/13 09:52	

LABORATORY CONTROL SAMPLE: 1496121

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	88.8	89	80-120	

SAMPLE DUPLICATE: 1496122

Parameter	Units	10237675055 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	14.5	15.6	7	10	

SAMPLE DUPLICATE: 1496123

Parameter	Units	10237680012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	226	229	1	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/31666 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020, 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027

METHOD BLANK: 1496133 — Matrix: Water
Associated Lab Samples: 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020, 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/07/13 09:57	

METHOD BLANK: 1496136 — Matrix: Water
Associated Lab Samples: 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019, 10237680020, 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/07/13 09:58	

LABORATORY CONTROL SAMPLE: 1496134

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	92.8	93	80-120	

SAMPLE DUPLICATE: 1496135

Parameter	Units	10237680013 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	327	322	1	10	

SAMPLE DUPLICATE: 1496137

Parameter	Units	10237680027 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	4110	4080	.9	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/31686 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033

METHOD BLANK: 1496992 Matrix: Water
Associated Lab Samples: 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/08/13 11:53	

METHOD BLANK: 1496996 Matrix: Water
Associated Lab Samples: 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/08/13 11:53	

LABORATORY CONTROL SAMPLE: 1496993

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	89.8	90	80-120	

SAMPLE DUPLICATE: 1496994

Parameter	Units	10237714001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1496995

Parameter	Units	10237680033 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	819	820	.1	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/31687 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040, 10237680041, 10237680042, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054

METHOD BLANK: 1496997 — Matrix: Water
Associated Lab Samples: 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040, 10237680041, 10237680042, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/08/13 11:59	

METHOD BLANK: 1497001 — Matrix: Water
Associated Lab Samples: 10237680034, 10237680035, 10237680036, 10237680037, 10237680038, 10237680039, 10237680040, 10237680041, 10237680042, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/08/13 11:59	

LABORATORY CONTROL SAMPLE: 1496998

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	83.0	83	80-120	

SAMPLE DUPLICATE: 1496999

Parameter	Units	10237680034 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	2950	3200	8	10	

SAMPLE DUPLICATE: 1497000

Parameter	Units	10237680050 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/31691 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10237680057, 10237680059, 10237680060, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069

METHOD BLANK: 1497149 — Matrix: Water
Associated Lab Samples: 10237680057, 10237680059, 10237680060, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/08/13 14:08	

METHOD BLANK: 1497153 — Matrix: Water
Associated Lab Samples: 10237680057, 10237680059, 10237680060, 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/08/13 14:08	

LABORATORY CONTROL SAMPLE: 1497150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	95.8	96	80-120	

SAMPLE DUPLICATE: 1497151

Parameter	Units	10237680057 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	4060	4350	7	10	

SAMPLE DUPLICATE: 1497152

Parameter	Units	10237721006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	11.3		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/31755 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

METHOD BLANK: 1500073 Matrix: Water
Associated Lab Samples: 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/12/13 10:56	

METHOD BLANK: 1500077 Matrix: Water
Associated Lab Samples: 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/12/13 10:57	

LABORATORY CONTROL SAMPLE: 1500074

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	95.8	96	80-120	

SAMPLE DUPLICATE: 1500075

Parameter	Units	10237602001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	26.3	24.0	9	10	

SAMPLE DUPLICATE: 1500076

Parameter	Units	10237886001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	103	99.2	3	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WET/33849 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 10237680008, 10237680009, 10237680036

LABORATORY CONTROL SAMPLE: 1603269

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	100	98-102	H6

SAMPLE DUPLICATE: 1603270

Parameter	Units	10237680008 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.7	6.7	.3	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/17057 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10237680008, 10237680009, 10237680036

METHOD BLANK: 1604003 | Matrix: Water
Associated Lab Samples: 10237680008, 10237680009, 10237680036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/15706 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019

METHOD BLANK: 1496554 — Matrix: Water
Associated Lab Samples: 10237680001, 10237680002, 10237680003, 10237680004, 10237680005, 10237680006, 10237680007, 10237680008, 10237680009, 10237680010, 10237680011, 10237680012, 10237680013, 10237680014, 10237680015, 10237680016, 10237680017, 10237680018, 10237680019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	08/07/13 14:05	

LABORATORY CONTROL SAMPLE: 1496555

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.7	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496556 — 1496557

Parameter	Units	10237675062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	33.5	20	20	51.0	50.2	87	83	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496558 — 1496559

Parameter	Units	10237680010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	21.2	20.9	106	105	80-120	1	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/15707 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10237680020, 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036

METHOD BLANK: 1496719 — Matrix: Water
Associated Lab Samples: 10237680020, 10237680021, 10237680022, 10237680023, 10237680024, 10237680025, 10237680026, 10237680027, 10237680028, 10237680029, 10237680030, 10237680031, 10237680032, 10237680033, 10237680034, 10237680035, 10237680036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	08/07/13 14:37	

LABORATORY CONTROL SAMPLE: 1496720

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.8	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496721 — 1496722

Parameter	Units	10237714001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	145	20	20	166	166	105	103	80-120	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496723 — 1496724

Parameter	Units	10237680027 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	19.3	20	20	48.6	48.9	147	148	80-120	.5	30	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/15708 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10237680037, 10237680038, 10237680039, 10237680040, 10237680041, 10237680042, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680057, 10237680059, 10237680060

METHOD BLANK: 1496782 — Matrix: Water
Associated Lab Samples: 10237680037, 10237680038, 10237680039, 10237680040, 10237680041, 10237680042, 10237680044, 10237680045, 10237680046, 10237680047, 10237680048, 10237680049, 10237680050, 10237680051, 10237680052, 10237680053, 10237680054, 10237680057, 10237680059, 10237680060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	08/07/13 15:18	

LABORATORY CONTROL SAMPLE: 1496783

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.8	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496784 — 1496785

Parameter	Units	10237680037 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	14.4	20	20	33.6	34.0	96	98	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496786 — 1496787

Parameter	Units	10237680048 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	18.8	20	20	38.5	39.0	98	101	80-120	1	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/15709 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

METHOD BLANK: 1496840 — Matrix: Water
Associated Lab Samples: 10237680062, 10237680063, 10237680064, 10237680065, 10237680066, 10237680067, 10237680068, 10237680069, 10237680075, 10237680076, 10237680077, 10237680078, 10237680079, 10237680080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	08/07/13 15:50	

LABORATORY CONTROL SAMPLE: 1496841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	8.0	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496842 — 1496843

Parameter	Units	10237693010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	21.4	20.6	107	103	80-120	3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496844 — 1496845

Parameter	Units	10237680075 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	37.3	20	20	54.7	54.4	87	85	80-120	.5	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/17041 | Analysis Method: SM 4500-Cl E
QC Batch Method: SM 4500-Cl E | Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10237680008, 10237680009, 10237680036

METHOD BLANK: 1603873 | Matrix: Water
Associated Lab Samples: 10237680008, 10237680009, 10237680036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

QC Batch: WETA/17023 | Analysis Method: SM 4500-NO2 B
QC Batch Method: SM 4500-NO2 B | Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10237680008, 10237680009, 10237680036

METHOD BLANK: 1603178 | Matrix: Water
Associated Lab Samples: 10237680008, 10237680009, 10237680036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
ES	The reported result is estimated because one or more of the constituent results are qualified as such.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680001	**SD0543-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680002	**SD0544-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680003	**SD0545-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680004	**SD0546-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680005	**SD0547-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680006	**SD0548-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680007	**SD0549-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680008	**SD0550-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680009	**SD0551-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680010	**SD0552-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680011	**SD0553-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680012	**SD0554-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680013	**SD0555-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680014	**SD0556-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680015	**SD0557-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680016	**SD0558-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680017	**SD0559-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680018	**SD0560-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680019	**SD0561-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680020	**SD0562-080113**	EPA 200.8	MPRP/41079	EPA 200.8	ICPM/17283
10237680021	**SD0563-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680022	**SD0564-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680023	**SD0565-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680024	**SD0566-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680025	**SD0567-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680026	**SD0568-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680027	**SD0569-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680028	**SD0570-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680029	**SD0571-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680030	**SD0572-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680031	**SD0573-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680032	**SD0574-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680033	**SD0575-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680034	**SD0576-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680035	**SD0577-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680036	**SD0578-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680037	**SD0579-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680038	**SD0580-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680039	**SD0581-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680040	**SD0582-080113**	EPA 200.8	MPRP/41080	EPA 200.8	ICPM/17285
10237680041	**SD0583-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680042	**SD0584-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680043	**SD0585-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680044	**SD0586-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680045	**SD0587-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680046	**SD0588-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680047	**SD0589-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680048	**SD0590-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680049	**SD0591-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680050	**SD0592-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680051	**SD0593-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680052	**SD0594-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680053	**SD0595-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680054	**SD0596-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680055	**SD0597-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680056	**SD0598-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680057	**SD0599-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680058	**SD0600-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680059	**SD0601-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680060	**SD0602-080113**	EPA 200.8	MPRP/41081	EPA 200.8	ICPM/17247
10237680061	**SD0603-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680062	**SD0604-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680063	**SD0605-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680064	**SD0606-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680065	**SD0607-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680066	**SD0608-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680067	**SD0609-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680068	**SD0610-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680069	**SD0611-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680075	**SD0617-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680076	**SD0618-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680077	**SD0619-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680078	**SD0620-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680079	**SD0621-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680080	**SD0622-080113**	EPA 200.8	MPRP/41082	EPA 200.8	ICPM/17249
10237680001	**SD0543-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680002	**SD0544-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680003	**SD0545-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680005	**SD0547-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680006	**SD0548-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680007	**SD0549-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680008	**SD0550-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680009	**SD0551-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680010	**SD0552-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680011	**SD0553-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680012	**SD0554-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680013	**SD0555-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680014	**SD0556-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680015	**SD0557-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680016	**SD0558-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680017	**SD0559-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680018	**SD0560-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680019	**SD0561-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680020	**SD0562-080113**	EPA 200.8	MPRP/41087	EPA 200.8	ICPM/17284
10237680021	**SD0563-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680022	**SD0564-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680023	**SD0565-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680024	**SD0566-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680025	**SD0567-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680026	**SD0568-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680027	**SD0569-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680028	**SD0570-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680029	**SD0571-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680030	**SD0572-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680031	**SD0573-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680032	**SD0574-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680033	**SD0575-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680034	**SD0576-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680035	**SD0577-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680036	**SD0578-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680037	**SD0579-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680038	**SD0580-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680039	**SD0581-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680040	**SD0582-080113**	EPA 200.8	MPRP/41088	EPA 200.8	ICPM/17286
10237680041	**SD0583-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680042	**SD0584-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680043	**SD0585-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680044	**SD0586-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680045	**SD0587-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680046	**SD0588-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680047	**SD0589-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680048	**SD0590-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680049	**SD0591-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680050	**SD0592-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680051	**SD0593-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680052	**SD0594-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680053	**SD0595-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680054	**SD0596-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680055	**SD0597-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680056	**SD0598-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680057	**SD0599-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680058	**SD0600-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680059	**SD0601-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680060	**SD0602-080113**	EPA 200.8	MPRP/41089	EPA 200.8	ICPM/17295
10237680061	**SD0603-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680062	**SD0604-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680063	**SD0605-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680064	**SD0606-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680065	**SD0607-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680066	**SD0608-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680067	**SD0609-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680068	**SD0610-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680069	**SD0611-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680075	**SD0617-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680076	**SD0618-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680077	**SD0619-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680078	**SD0620-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680079	**SD0621-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680080	**SD0622-080113**	EPA 200.8	MPRP/41090	EPA 200.8	ICPM/17296
10237680001	**SD0543-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680002	**SD0544-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680003	**SD0545-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680004	**SD0546-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680005	**SD0547-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680006	**SD0548-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680007	**SD0549-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680008	**SD0550-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680009	**SD0551-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680010	**SD0552-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680011	**SD0553-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680012	**SD0554-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680013	**SD0555-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680014	**SD0556-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680015	**SD0557-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680016	**SD0558-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680017	**SD0559-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680018	**SD0560-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680019	**SD0561-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680020	**SD0562-080113**	EPA 245.1	MERP/9000	EPA 245.1	MERC/10322
10237680021	**SD0563-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680022	**SD0564-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680023	**SD0565-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680024	**SD0566-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680025	**SD0567-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680026	**SD0568-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680027	**SD0569-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680028	**SD0570-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680029	**SD0571-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680030	**SD0572-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680031	**SD0573-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680032	**SD0574-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680033	**SD0575-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680034	**SD0576-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680035	**SD0577-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680036	**SD0578-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680037	**SD0579-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680038	**SD0580-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680039	**SD0581-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680040	**SD0582-080113**	EPA 245.1	MERP/9065	EPA 245.1	MERC/10347
10237680041	**SD0583-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680042	**SD0584-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680043	**SD0585-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680044	**SD0586-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680045	**SD0587-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680046	**SD0588-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680047	**SD0589-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680048	**SD0590-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680049	**SD0591-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680050	**SD0592-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680051	**SD0593-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680052	**SD0594-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680053	**SD0595-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680054	**SD0596-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680055	**SD0597-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680056	**SD0598-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680057	**SD0599-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680058	**SD0600-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680059	**SD0601-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680060	**SD0602-080113**	EPA 245.1	MERP/9002	EPA 245.1	MERC/10312
10237680061	**SD0603-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680062	**SD0604-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680063	**SD0605-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680064	**SD0606-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680065	**SD0607-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680066	**SD0608-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680067	**SD0609-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680068	**SD0610-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680069	**SD0611-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680075	**SD0617-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680076	**SD0618-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680077	**SD0619-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680078	**SD0620-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680079	**SD0621-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680080	**SD0622-080113**	EPA 245.1	MERP/9003	EPA 245.1	MERC/10315
10237680001	**SD0543-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680002	**SD0544-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680003	**SD0545-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680005	**SD0547-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680006	**SD0548-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680007	**SD0549-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680008	**SD0550-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680009	**SD0551-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680010	**SD0552-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680011	**SD0553-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680012	**SD0554-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680013	**SD0555-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680014	**SD0556-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680015	**SD0557-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680016	**SD0558-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680017	**SD0559-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680018	**SD0560-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680019	**SD0561-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680020	**SD0562-080113**	EPA 245.1	MERP/9004	EPA 245.1	MERC/10302
10237680021	**SD0563-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680022	**SD0564-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680023	**SD0565-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680024	**SD0566-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680025	**SD0567-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680026	**SD0568-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680027	**SD0569-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680028	**SD0570-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680029	**SD0571-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680030	**SD0572-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680031	**SD0573-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680032	**SD0574-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680033	**SD0575-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680034	**SD0576-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680035	**SD0577-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680036	**SD0578-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680037	**SD0579-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680038	**SD0580-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680039	**SD0581-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680040	**SD0582-080113**	EPA 245.1	MERP/9005	EPA 245.1	MERC/10298
10237680041	**SD0583-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680042	**SD0584-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680043	**SD0585-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680044	**SD0586-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680045	**SD0587-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680046	**SD0588-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680047	**SD0589-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680048	**SD0590-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680049	**SD0591-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680050	**SD0592-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680051	**SD0593-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680052	**SD0594-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680053	**SD0595-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680054	**SD0596-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680055	**SD0597-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680056	**SD0598-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680057	**SD0599-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680058	**SD0600-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680059	**SD0601-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680060	**SD0602-080113**	EPA 245.1	MERP/9006	EPA 245.1	MERC/10299
10237680061	**SD0603-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680062	**SD0604-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680063	**SD0605-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680064	**SD0606-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680065	**SD0607-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680066	**SD0608-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680067	**SD0609-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680068	**SD0610-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680069	**SD0611-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680075	**SD0617-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680076	**SD0618-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680077	**SD0619-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680078	**SD0620-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680079	**SD0621-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680080	**SD0622-080113**	EPA 245.1	MERP/9007	EPA 245.1	MERC/10316
10237680008	**SD0550-080113**	SM 2320B	WET/33876		
10237680009	**SD0551-080113**	SM 2320B	WET/33876		
10237680036	**SD0578-080113**	SM 2320B	WET/33876		
10237680001	**SD0543-080113**	SM 2540D	WET/31664		
10237680002	**SD0544-080113**	SM 2540D	WET/31664		
10237680003	**SD0545-080113**	SM 2540D	WET/31664		
10237680004	**SD0546-080113**	SM 2540D	WET/31664		
10237680005	**SD0547-080113**	SM 2540D	WET/31664		
10237680006	**SD0548-080113**	SM 2540D	WET/31664		
10237680007	**SD0549-080113**	SM 2540D	WET/31664		
10237680008	**SD0550-080113**	SM 2540D	WET/31664		
10237680009	**SD0551-080113**	SM 2540D	WET/31664		
10237680010	**SD0552-080113**	SM 2540D	WET/31664		
10237680011	**SD0553-080113**	SM 2540D	WET/31664		
10237680012	**SD0554-080113**	SM 2540D	WET/31664		
10237680013	**SD0555-080113**	SM 2540D	WET/31666		
10237680014	**SD0556-080113**	SM 2540D	WET/31666		
10237680015	**SD0557-080113**	SM 2540D	WET/31666		
10237680016	**SD0558-080113**	SM 2540D	WET/31666		
10237680017	**SD0559-080113**	SM 2540D	WET/31666		
10237680018	**SD0560-080113**	SM 2540D	WET/31666		
10237680019	**SD0561-080113**	SM 2540D	WET/31666		
10237680020	**SD0562-080113**	SM 2540D	WET/31666		
10237680021	**SD0563-080113**	SM 2540D	WET/31666		
10237680022	**SD0564-080113**	SM 2540D	WET/31666		
10237680023	**SD0565-080113**	SM 2540D	WET/31666		
10237680024	**SD0566-080113**	SM 2540D	WET/31666		
10237680025	**SD0567-080113**	SM 2540D	WET/31666		
10237680026	**SD0568-080113**	SM 2540D	WET/31666		
10237680027	**SD0569-080113**	SM 2540D	WET/31666		
10237680028	**SD0570-080113**	SM 2540D	WET/31686		
10237680029	**SD0571-080113**	SM 2540D	WET/31686		
10237680030	**SD0572-080113**	SM 2540D	WET/31686		
10237680031	**SD0573-080113**	SM 2540D	WET/31686		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680032	**SD0574-080113**	SM 2540D	WET/31686		
10237680033	**SD0575-080113**	SM 2540D	WET/31686		
10237680034	**SD0576-080113**	SM 2540D	WET/31687		
10237680035	**SD0577-080113**	SM 2540D	WET/31687		
10237680036	**SD0578-080113**	SM 2540D	WET/31687		
10237680037	**SD0579-080113**	SM 2540D	WET/31687		
10237680038	**SD0580-080113**	SM 2540D	WET/31687		
10237680039	**SD0581-080113**	SM 2540D	WET/31687		
10237680040	**SD0582-080113**	SM 2540D	WET/31687		
10237680041	**SD0583-080113**	SM 2540D	WET/31687		
10237680042	**SD0584-080113**	SM 2540D	WET/31687		
10237680044	**SD0586-080113**	SM 2540D	WET/31687		
10237680045	**SD0587-080113**	SM 2540D	WET/31687		
10237680046	**SD0588-080113**	SM 2540D	WET/31687		
10237680047	**SD0589-080113**	SM 2540D	WET/31687		
10237680048	**SD0590-080113**	SM 2540D	WET/31687		
10237680049	**SD0591-080113**	SM 2540D	WET/31687		
10237680050	**SD0592-080113**	SM 2540D	WET/31687		
10237680051	**SD0593-080113**	SM 2540D	WET/31687		
10237680052	**SD0594-080113**	SM 2540D	WET/31687		
10237680053	**SD0595-080113**	SM 2540D	WET/31687		
10237680054	**SD0596-080113**	SM 2540D	WET/31687		
10237680057	**SD0599-080113**	SM 2540D	WET/31691		
10237680059	**SD0601-080113**	SM 2540D	WET/31691		
10237680060	**SD0602-080113**	SM 2540D	WET/31691		
10237680062	**SD0604-080113**	SM 2540D	WET/31691		
10237680063	**SD0605-080113**	SM 2540D	WET/31691		
10237680064	**SD0606-080113**	SM 2540D	WET/31691		
10237680065	**SD0607-080113**	SM 2540D	WET/31691		
10237680066	**SD0608-080113**	SM 2540D	WET/31691		
10237680067	**SD0609-080113**	SM 2540D	WET/31691		
10237680068	**SD0610-080113**	SM 2540D	WET/31691		
10237680069	**SD0611-080113**	SM 2540D	WET/31691		
10237680075	**SD0617-080113**	SM 2540D	WET/31755		
10237680076	**SD0618-080113**	SM 2540D	WET/31755		
10237680077	**SD0619-080113**	SM 2540D	WET/31755		
10237680078	**SD0620-080113**	SM 2540D	WET/31755		
10237680079	**SD0621-080113**	SM 2540D	WET/31755		
10237680080	**SD0622-080113**	SM 2540D	WET/31755		
10237680008	**SD0550-080113**	SM 4500-H+B	WET/33849		
10237680009	**SD0551-080113**	SM 4500-H+B	WET/33849		
10237680036	**SD0578-080113**	SM 4500-H+B	WET/33849		
10237680008	**SD0550-080113**	SM 4500-NO3 H	WETA/17057		
10237680009	**SD0551-080113**	SM 4500-NO3 H	WETA/17057		
10237680036	**SD0578-080113**	SM 4500-NO3 H	WETA/17057		
10237680001	**SD0543-080113**	ASTM D516	WETA/15706		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680002	**SD0544-080113**	ASTM D516	WETA/15706		
10237680003	**SD0545-080113**	ASTM D516	WETA/15706		
10237680004	**SD0546-080113**	ASTM D516	WETA/15706		
10237680005	**SD0547-080113**	ASTM D516	WETA/15706		
10237680006	**SD0548-080113**	ASTM D516	WETA/15706		
10237680007	**SD0549-080113**	ASTM D516	WETA/15706		
10237680008	**SD0550-080113**	ASTM D516	WETA/15706		
10237680009	**SD0551-080113**	ASTM D516	WETA/15706		
10237680010	**SD0552-080113**	ASTM D516	WETA/15706		
10237680011	**SD0553-080113**	ASTM D516	WETA/15706		
10237680012	**SD0554-080113**	ASTM D516	WETA/15706		
10237680013	**SD0555-080113**	ASTM D516	WETA/15706		
10237680014	**SD0556-080113**	ASTM D516	WETA/15706		
10237680015	**SD0557-080113**	ASTM D516	WETA/15706		
10237680016	**SD0558-080113**	ASTM D516	WETA/15706		
10237680017	**SD0559-080113**	ASTM D516	WETA/15706		
10237680018	**SD0560-080113**	ASTM D516	WETA/15706		
10237680019	**SD0561-080113**	ASTM D516	WETA/15706		
10237680020	**SD0562-080113**	ASTM D516	WETA/15707		
10237680021	**SD0563-080113**	ASTM D516	WETA/15707		
10237680022	**SD0564-080113**	ASTM D516	WETA/15707		
10237680023	**SD0565-080113**	ASTM D516	WETA/15707		
10237680024	**SD0566-080113**	ASTM D516	WETA/15707		
10237680025	**SD0567-080113**	ASTM D516	WETA/15707		
10237680026	**SD0568-080113**	ASTM D516	WETA/15707		
10237680027	**SD0569-080113**	ASTM D516	WETA/15707		
10237680028	**SD0570-080113**	ASTM D516	WETA/15707		
10237680029	**SD0571-080113**	ASTM D516	WETA/15707		
10237680030	**SD0572-080113**	ASTM D516	WETA/15707		
10237680031	**SD0573-080113**	ASTM D516	WETA/15707		
10237680032	**SD0574-080113**	ASTM D516	WETA/15707		
10237680033	**SD0575-080113**	ASTM D516	WETA/15707		
10237680034	**SD0576-080113**	ASTM D516	WETA/15707		
10237680035	**SD0577-080113**	ASTM D516	WETA/15707		
10237680036	**SD0578-080113**	ASTM D516	WETA/15707		
10237680037	**SD0579-080113**	ASTM D516	WETA/15708		
10237680038	**SD0580-080113**	ASTM D516	WETA/15708		
10237680039	**SD0581-080113**	ASTM D516	WETA/15708		
10237680040	**SD0582-080113**	ASTM D516	WETA/15708		
10237680041	**SD0583-080113**	ASTM D516	WETA/15708		
10237680042	**SD0584-080113**	ASTM D516	WETA/15708		
10237680044	**SD0586-080113**	ASTM D516	WETA/15708		
10237680045	**SD0587-080113**	ASTM D516	WETA/15708		
10237680046	**SD0588-080113**	ASTM D516	WETA/15708		
10237680047	**SD0589-080113**	ASTM D516	WETA/15708		
10237680048	**SD0590-080113**	ASTM D516	WETA/15708		
10237680049	**SD0591-080113**	ASTM D516	WETA/15708		
10237680050	**SD0592-080113**	ASTM D516	WETA/15708		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10237680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237680051	**SD0593-080113**	ASTM D516	WETA/15708		
10237680052	**SD0594-080113**	ASTM D516	WETA/15708		
10237680053	**SD0595-080113**	ASTM D516	WETA/15708		
10237680054	**SD0596-080113**	ASTM D516	WETA/15708		
10237680057	**SD0599-080113**	ASTM D516	WETA/15708		
10237680059	**SD0601-080113**	ASTM D516	WETA/15708		
10237680060	**SD0602-080113**	ASTM D516	WETA/15708		
10237680062	**SD0604-080113**	ASTM D516	WETA/15709		
10237680063	**SD0605-080113**	ASTM D516	WETA/15709		
10237680064	**SD0606-080113**	ASTM D516	WETA/15709		
10237680065	**SD0607-080113**	ASTM D516	WETA/15709		
10237680066	**SD0608-080113**	ASTM D516	WETA/15709		
10237680067	**SD0609-080113**	ASTM D516	WETA/15709		
10237680068	**SD0610-080113**	ASTM D516	WETA/15709		
10237680069	**SD0611-080113**	ASTM D516	WETA/15709		
10237680075	**SD0617-080113**	ASTM D516	WETA/15709		
10237680076	**SD0618-080113**	ASTM D516	WETA/15709		
10237680077	**SD0619-080113**	ASTM D516	WETA/15709		
10237680078	**SD0620-080113**	ASTM D516	WETA/15709		
10237680079	**SD0621-080113**	ASTM D516	WETA/15709		
10237680080	**SD0622-080113**	ASTM D516	WETA/15709		
10237680008	**SD0550-080113**	SM 4500-Cl E	WETA/17041		
10237680009	**SD0551-080113**	SM 4500-Cl E	WETA/17041		
10237680036	**SD0578-080113**	SM 4500-Cl E	WETA/17041		
10237680008	**SD0550-080113**	SM 4500-NO2 B	WETA/17023		
10237680009	**SD0551-080113**	SM 4500-NO2 B	WETA/17023		
10237680036	**SD0578-080113**	SM 4500-NO2 B	WETA/17023		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237680

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4							Comments
	SD0543-080113	8/3/2013	13:26		x			3	1		2				x	x	x							001
	SD0544-080113	8/3/2013	13:29		x			3	1		2				x	x	x							002
	SD0545-080113	8/3/2013	13:32		x			3	1		2				x	x	x							003
	SD0546-080113	8/3/2013	13:35		x			2	1		1				x		x							004
	SD0547-080113	8/3/2013	13:39		x			3	1		2				x	x	x							005
	SD0548-080113	8/3/2013	13:42		x			3	1		2				x	x	x							006
	SD0549-080113	8/3/2013	13:46		x			3	1		2				x	x	x							007
	SD0550-080113	8/3/2013	13:50		x			3	1		2				x	x	x							008
	SD0551-080113	8/3/2013	13:53		x			3	1		2				x	x	x							009
	SD0552-080113	8/3/2013	13:57		x			3	1		2				x	x	x							010

Sampler's Name: Janelle Fitzpatrick
Sampler's Company: TREC INC
Shipment Method: Fed Ex Ship Date: 8/5/2013
Shipment Tracking No: 8006 6032 3437

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature]	8/5/13	1218	[signature]	8.41	8.6.13

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

4.7, 4.2, 2.2, 2.0, 0.8, 1.4, 4.0, 3.5, 1.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237640

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0553-080113	8/3/2013	14:03		x			3	1		2				x	x	x								011
	SD0554-080113	8/3/2013	14:06		x			3	1		2				x	x	x								012
	SD0555-080113	8/3/2013	14:09		x			3	1		2				x	x	x								013
	SD0556-080113	8/3/2013	14:12		x			3	1		2				x	x	x								014
	SD0557-080113	8/3/2013	14:15		x			3	1		2				x	x	x								015
	SD0558-080113	8/3/2013	14:18		x			3	1		2				x	x	x								016
	SD0559-080113	8/3/2013	14:21		x			3	1		2				x	x	x								017
	SD0560-080113	8/3/2013	14:39		x			3	1		2				x	x	x								018
	SD0561-080113	8/3/2013	14:42		x			3	1		2				x	x	x								019
	SD0562-080113	8/3/2013	14:45		x			3	1		2				x	x	x								020

Sampler's Name:	Janelle Fitzpatrick	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC		8/5/13	1218		8/6/13	8:41
Shipment Method:	Fed Ex Ship Date: 8/5/2013						
Shipment Tracking No:	8006 6032 3437						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237640

Lab Name:	Pace Analytical Services	Facility Address:		Consultant/Contractor:	TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:		Consultant/Contractor Project No:	9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:		Address:	1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:		Consultant/Contractor PM:	Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:		Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0563-080113	8/3/2013	14:48		x			3	1		2				x	x	x								021
	SD0564-080113	8/3/2013	14:52		x			3	1		2				x	x	x								022
	SD0565-080113	8/4/2013	8:11		x			3	1		2				x	x	x								023
	SD0566-080113	8/4/2013	8:16		x			3	1		2				x	x	x								024
	SD0567-080113	8/4/2013	8:19		x			3	1		2				x	x	x								025
	SD0568-080113	8/4/2013	8:23		x			3	1		2				x	x	x								026
	SD0569-080113	8/4/2013	8:26		x			3	1		2				x	x	x								027
	SD0570-080113	8/4/2013	8:29		x			3	1		2				x	x	x								028
	SD0571-080113	8/4/2013	8:32		x			3	1		2				x	x	x								029
	SD0572-080113	8/4/2013	8:35		x			3	1		2				x	x	x								030

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC			[signature]	8/5/13	1218	[signature]	8.6.13	8.41
Shipment Method:	Fed Ex	Ship Date:	8/5/2013						
Shipment Tracking No:	8006 6032 3437								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: ____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0573-080113	8/4/2013	8:40		x			3	1		2				x	x	x								031
	SD0574-080113	8/4/2013	8:43		x			3	1		2				x	x	x								032
	SD0575-080113	8/4/2013	8:47		x			3	1		2				x	x	x								033
	SD0576-080113	8/4/2013	8:50		x			3	1		2				x	x	x								034
	SD0577-080113	8/4/2013	8:54		x			3	1		2				x	x	x								035
	SD0578-080113	8/4/2013	8:57		x			3	1		2				x	x	x								036
	SD0579-080113	8/4/2013	9:02		x			3	1		2				x	x	x								037
	SD0580-080113	8/4/2013	9:09		x			3	1		2				x	x	x								038
	SD0581-080113	8/4/2013	9:12		x			3	1		2				x	x	x								039
	SD0582-080113	8/4/2013	9:15		x			3	1		2				x	x	x								080

Requested Analyses

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC				8/5/13	1218		8.6.13	~~8:44~~
Shipment Method:	Fed Ex	Ship Date:	8/5/2013						8:41
Shipment Tracking No:	8006 6032 3437								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237680

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Paokage ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0583-080113	8/4/2013	9:19		x			3	1		2				x	x	x								041
	SD0584-080113	8/4/2013	9:22		x			3	1		2				x	x	x								042
	SD0585-080113	8/4/2013	9:28		x			2			2				x	x									043
	SD0586-080113	8/4/2013	9:32		x			3	1		2				x	x	x								044
	SD0587-080113	8/4/2013	9:36		x			3	1		2				x	x	x								045
	SD0588-080113	8/4/2013	9:39		x			3	1		2				x	x	x								046
	SD0589-080113	8/4/2013	9:45		x			3	1		2				x	x	x								047
	SD0590-080113	8/4/2013	9:49		x			3	1		2				x	x	x								048
	SD0591-080113	8/4/2013	9:52		x			3	1		2				x	x	x								049
	SD0592-080113	8/4/2013	9:55		x			3	1		2				x	x	x								050

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC				8/5/13	1218		8/6/13	8:41
Shipment Method:	Fed Ex	Ship Date:	8/5/2013						
Shipment Tracking No:	8006 6032 3437								

Special Instructions:

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237550

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0593-080113	8/4/2013	9:58		x			3	1		2				x	x	x								051
	SD0594-080113	8/4/2013	10:02		x			3	1		2				x	x	x								052
	SD0595-080113	8/4/2013	10:08		x			3	1		2				x	x	x								053
	SD0596-080113	8/4/2013	10:13		x			3	1		2				x	x	x								054
	SD0597-080113	8/4/2013	10:21		x			2			2				x	x									055
	SD0598-080113	8/4/2013	10:23		x			2			2				x	x									056
	SD0599-080113	8/4/2013	10:28		x			3	1		2				x	x	x								057
	SD0600-080113	8/4/2013	10:32		x			2			2				x	x									058
	SD0601-080113	8/4/2013	10:39		x			3	1		2				x	x	x								059
	SD0602-080113	8/4/2013	10:45		x			3	1		2				x	x	x								060

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC				8/5/13	12/8		8.6.13	9:41
Shipment Method:	Fed Ex	Ship Date:	8/5/2013						
Shipment Tracking No:	8006 6032 3437								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: ____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237640

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4							Comments
	SD0603-080113	8/4/2013	10:49		x			2			2				x	x								061
	SD0604-080113	8/4/2013	12:13		x			3	1		2				x	x	x							062
	SD0605-080113	8/4/2013	12:17		x			3	1		2				x	x	x							063
	SD0606-080113	8/4/2013	12:21		x			3	1		2				x	x	x							064
	SD0607-080113	8/4/2013	12:25		x			3	1		2				x	x	x							065
	SD0608-080113	8/4/2013	12:28		x			3	1		2				x	x	x							066
	SD0609-080113	8/4/2013	12:32		x			3	1		2				x	x	x							067
	SD0610-080113	8/4/2013	12:35		x			3	1		2				x	x	x							068
	SD0611-080113	8/4/2013	12:38		x			3	1		2				x	x	x							069
	SD0612-080113	8/4/2013	12:41		x			2			2				x	x								070

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC				8/5/13	1218		8/6/13	8:41
Shipment Method:	Fed Ex	Ship Date:	8/5/2013						
Shipment Tracking No:	8006 6032 3437								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: ____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10237680

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		Requested Analyses: As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0613-080113	8/4/2013	12:43		x			2			2				x	x									071
	SD0614-080113	8/4/2013	12:47		x			3	1		2				x	x	x								072
	SD0615-080113	8/4/2013	12:49		x			2			2				x	x									073
	SD0616-080113	8/4/2013	12:52		x			2			2				x	x									074
	SD0617-080113	8/5/2013	12:10		X			3	1		2				x	x	x								075
	SD0618-080113	8/5/2013	12:16		x			3	1		2				x	x	x								076
	SD0619-080113	8/5/2013	12:22		x			3	1		2				x	x	x								077
	SD0620-080113	8/5/2013	12:26		x			3	1		2				x	x	x								078
	SD0621-080113	8/5/2013	12:30		x			3	1		2				x	x	x								079
	SD0622-080113	8/5/2013	12:34		x			3	1		2				x	x	x								080

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC				8/5/13	1218		8/6/13	8:41
Shipment Method:	Fed Ex	Ship Date:	8/5/2013						
Shipment Tracking No:	8006 6032 3437								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: ____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: B.P-Trec, Inc

Project #: WO#: 10237680

10237680

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: SCUR Exception Form

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☑ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): **Cooler Temp Corrected (°C):** SCUR Exception Form **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.2, +.3 **Date and Initials of Person Examining Contents:** CW 8.6.13

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 500548-SD0622 2/2
Per method, VOA pH is checked after analysis				Initial when completed: CW Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (If purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 9:20	Temp:	Corrected Temp:
Time: 9:40	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 8/7/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical®	Document Name: **SCUR Exceptions Form**	Document Revised: 16Apr2012 Page 1 of 1
	Document No.: **F-MN-L-220-Rev.00**	Issuing Authority: Pace Minnesota Quality Office

Workorder #: 10237680

Tracking # Issue	Temp on cooler Sample ID	corrected Temp Container Type/#
7958 0572 9480	4.5	4.7
" " 9527	4.0	4.2
" " 9550	2.0	2.2
" " 9505	1.8	2.0
" " 9490	0.6	0.8
" " 9538	1.2	1.4
" " 9516	3.8	4.0
" " 9549	3.3	3.5
8006 6032 3437	0.8	1.0

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 21, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10237712

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 06, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10237712

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10237712

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10237712001	**LAO-SS-1-080113**	Water	08/01/13 10:30	08/06/13 08:41
10237712002	**LAO-SS-2-080513**	Water	08/05/13 11:20	08/06/13 08:41

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10237712

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10237712001	**LAO-SS-1-080113**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10237712002	**LAO-SS-2-080513**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10237712

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 21, 2013

General Information:
2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41160

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237712001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1497912)
  - Calcium
  - Magnesium
  - Silver
- MSD (Lab ID: 1497913)
  - Calcium
  - Magnesium
  - Silver

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10237712

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 21, 2013

Analyte Comments:

QC Batch: MPRP/41160

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1497912)
  - Calcium
- MSD (Lab ID: 1497913)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10237712

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: August 21, 2013

General Information:
2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10237712

Sample: LAO-SS-1-080113 **Lab ID: 10237712001** Collected: 08/01/13 10:30 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.041**	mg/L	0.0040	0.0015	1	08/09/13 12:25	08/17/13 04:06	7429-90-5	
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	08/09/13 12:25	08/17/13 04:06	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000032	1	08/09/13 12:25	08/17/13 04:06	7440-43-9	
Calcium	**124**	mg/L	0.40	0.20	20	08/09/13 12:25	08/20/13 01:45	7440-70-2	M1
Copper	**0.016**	mg/L	0.00050	0.00017	1	08/09/13 12:25	08/17/13 04:06	7440-50-8	
Iron	**0.067**	mg/L	0.050	0.0059	1	08/09/13 12:25	08/17/13 04:06	7439-89-6	
Lead	**0.0018**	mg/L	0.00010	0.000046	1	08/09/13 12:25	08/17/13 04:06	7439-92-1	
Magnesium	**23.3**	mg/L	0.025	0.012	5	08/09/13 12:25	08/17/13 04:11	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	08/09/13 12:25	08/20/13 12:02	7440-22-4	M1
Total Hardness by 2340B	**404**	mg/L	1.4	0.71	20	08/09/13 12:25	08/20/13 01:45		
Uranium-238	**0.0019**	mg/L	0.00050	0.00010	1	08/09/13 12:25	08/20/13 12:02	7440-61-1	
Zinc	**0.080**	mg/L	0.0050	0.00098	1	08/09/13 12:25	08/17/13 04:06	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 08:17	08/15/13 14:59	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10237712

Sample: LAO-SS-2-080513 **Lab ID: 10237712002** Collected: 08/05/13 11:20 Received: 08/06/13 08:41 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.083**	mg/L	0.0040	0.0015	1	08/09/13 12:25	08/17/13 04:50	7429-90-5	
Arsenic	**0.043**	mg/L	0.00050	0.000093	1	08/09/13 12:25	08/17/13 04:50	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000032	1	08/09/13 12:25	08/17/13 04:50	7440-43-9	
Calcium	**124**	mg/L	0.40	0.20	20	08/09/13 12:25	08/20/13 01:54	7440-70-2	
Copper	**0.43**	mg/L	0.00050	0.00017	1	08/09/13 12:25	08/17/13 04:50	7440-50-8	
Iron	**2.4**	mg/L	0.050	0.0059	1	08/09/13 12:25	08/17/13 04:50	7439-89-6	
Lead	**0.0022**	mg/L	0.00010	0.000046	1	08/09/13 12:25	08/17/13 04:50	7439-92-1	
Magnesium	**32.0**	mg/L	0.10	0.048	20	08/09/13 12:25	08/20/13 01:54	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	08/09/13 12:25	08/20/13 12:07	7440-22-4	
Total Hardness by 2340B	**442**	mg/L	1.4	0.71	20	08/09/13 12:25	08/20/13 01:54		
Uranium-238	**0.010**	mg/L	0.00050	0.00010	1	08/09/13 12:25	08/20/13 12:07	7440-61-1	
Zinc	**5.0**	mg/L	0.10	0.020	20	08/09/13 12:25	08/20/13 01:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 08:17	08/15/13 15:01	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10237712

QC Batch: MERP/9058 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10237712001, 10237712002

METHOD BLANK: 1502472 | Matrix: Water
Associated Lab Samples: 10237712001, 10237712002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/15/13 14:54	

LABORATORY CONTROL SAMPLE: 1502473

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0053	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1502474 1502475

Parameter	Units	10237712002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0053	0.0053	106	106	85-115	.2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10237712

QC Batch: MPRP/41160 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10237712001, 10237712002

METHOD BLANK: 1497910 | Matrix: Water
Associated Lab Samples: 10237712001, 10237712002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	08/20/13 11:57	
Arsenic	mg/L	ND	0.00050	08/17/13 04:33	
Cadmium	mg/L	ND	0.000080	08/17/13 04:33	
Calcium	mg/L	ND	0.020	08/17/13 04:33	
Copper	mg/L	ND	0.00050	08/17/13 04:33	
Iron	mg/L	ND	0.050	08/17/13 04:33	
Lead	mg/L	ND	0.00010	08/17/13 04:33	
Magnesium	mg/L	0.0032J	0.0050	08/17/13 04:33	
Silver	mg/L	ND	0.00050	08/20/13 11:57	
Uranium-238	mg/L	ND	0.00050	08/20/13 11:57	
Zinc	mg/L	0.0012J	0.0050	08/17/13 04:33	

LABORATORY CONTROL SAMPLE: 1497911

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	106	85-115	
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.080	100	85-115	
Calcium	mg/L	1	1.0	103	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	1.0	100	85-115	
Lead	mg/L	.08	0.078	97	85-115	
Magnesium	mg/L	1	1.0	104	85-115	
Silver	mg/L	.08	0.079	99	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.081	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1497912 1497913

Parameter	Units	10237712001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.041	.08	.08	0.14	0.14	123	120	70-130	2	20	
Arsenic	mg/L	0.021	.08	.08	0.10	0.11	105	107	70-130	2	20	
Cadmium	mg/L	0.00020	.08	.08	0.081	0.081	100	101	70-130	1	20	
Calcium	mg/L	124	1	1	129	133	528	910	70-130	3	20	E,M1
Copper	mg/L	0.016	.08	.08	0.096	0.098	100	103	70-130	2	20	
Iron	mg/L	0.067	1	1	1.0	1.1	98	100	70-130	2	20	
Lead	mg/L	0.0018	.08	.08	0.077	0.074	93	90	70-130	3	20	
Magnesium	mg/L	23.3	1	1	23.9	24.8	64	148	70-130	3	20	M1
Silver	mg/L	ND	.08	.08	0.026	0.027	33	34	70-130	2	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10237712

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1497912 1497913

Parameter	Units	10237712001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0019	.08	.08	0.084	0.084	102	103	70-130	.6	20	
Zinc	mg/L	0.080	.08	.08	0.16	0.16	100	102	70-130	1	20	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10237712

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10237712

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237712001	**LAO-SS-1-080113**	EPA 200.8	MPRP/41160	EPA 200.8	ICPM/17220
10237712002	**LAO-SS-2-080513**	EPA 200.8	MPRP/41160	EPA 200.8	ICPM/17220
10237712001	**LAO-SS-1-080113**	EPA 245.1	MERP/9058	EPA 245.1	MERC/10339
10237712002	**LAO-SS-2-080513**	EPA 245.1	MERP/9058	EPA 245.1	MERC/10339

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1128

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 10237712

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 630 1/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)								Comments
	LAO-SS-1 - 080113	8/1/13	10:30		X						2				X			X						10237712 001
	~~LAO-SS-1~~				~~X~~						2				~~X~~			~~X~~						No Sample
	LAO-SS-2 - 080513	8/5/13	11:20		X						1				X									002

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hichy						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	8/5/13	14:45	TN / Pace	8/6/13	841
Shipment Method: Fed Ex Ship Date: 8/5/13						
Shipment Tracking No: 5540 9197 7346						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer BP

Project #: WO#: 10237712

10237712

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 5540 9197 7346

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☐ Wet ☒ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.6 **Cooler Temp Corrected (°C):** 1.8 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.2 **Date and Initials of Person Examining Contents:** 8/13 TN

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # LAO SS 1 2/2 LAO SS 2 1
Per method, VOA pH is checked after analysis				Initial when completed: TN Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1110	Temp: 1.6	Corrected Temp: 1.8
Time: 1117	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 8/7/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

December 30, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 13, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 12/30/13 to add additional metals per the clients request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 5 #WD-15J
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10238388007	**LAO-BS-01-081213**	Water	08/12/13 13:40	08/13/13 09:02
10238388008	**LAO-BS-02-081213**	Water	08/12/13 13:42	08/13/13 09:02
10238388009	**LAO-BS-03-081213**	Water	08/12/13 13:44	08/13/13 09:02
10238388010	**LAO-BS-04-081213**	Water	08/12/13 13:46	08/13/13 09:02
10238388011	**LAO-BS-05-081213**	Water	08/12/13 13:48	08/13/13 09:02
10238388012	**LAO-BS-06-081213**	Water	08/12/13 13:50	08/13/13 09:02
10238388013	**LAO-BS-07-081213**	Water	08/12/13 13:52	08/13/13 09:02
10238388014	**LAO-BS-08-081213**	Water	08/12/13 13:54	08/13/13 09:02
10238388015	**LAO-BS-09-081213**	Water	08/12/13 13:56	08/13/13 09:02
10238388016	**LAO-BS-10-081213**	Water	08/12/13 13:58	08/13/13 09:02
10238388017	**LAO-BS-11-081213**	Water	08/12/13 14:00	08/13/13 09:02
10238388018	**LAO-BS-12-081213**	Water	08/12/13 14:02	08/13/13 09:02
10238388019	**LAO-BS-13-081213**	Water	08/12/13 14:04	08/13/13 09:02
10238388020	**LAO-BS-14-081213**	Water	08/12/13 14:06	08/13/13 09:02

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10238388007	**LAO-BS-01-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388008	**LAO-BS-02-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388009	**LAO-BS-03-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388010	**LAO-BS-04-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388011	**LAO-BS-05-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388012	**LAO-BS-06-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388013	**LAO-BS-07-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388014	**LAO-BS-08-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388015	**LAO-BS-09-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388016	**LAO-BS-10-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388017	**LAO-BS-11-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388018	**LAO-BS-12-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388019	**LAO-BS-13-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388020	**LAO-BS-14-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

General Information:
14 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41242

B: Analyte was detected in the associated method blank.

- BLANK for HBN 263742 [MPRP/412 (Lab ID: 1501025)
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41242

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10238388001,10238388011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1501027)
  - Calcium
  - Magnesium
  - Potassium
  - Silver
  - Sodium
- MS (Lab ID: 1501029)
  - Calcium
  - Silver

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

QC Batch: MPRP/41242

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10238388001,10238388011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Sodium
- MSD (Lab ID: 1501028)
  - Calcium
  - Magnesium
  - Potassium
  - Silver
  - Sodium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41242

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1501027)
  - Calcium
  - Sodium
- MS (Lab ID: 1501029)
  - Calcium
  - Sodium
- MSD (Lab ID: 1501028)
  - Calcium
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 30, 2013

General Information:
14 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-01-081213 **Lab ID: 10238388007** Collected: 08/12/13 13:40 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0073**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:17	7429-90-5	
Arsenic	**0.0027**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:17	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:17	7440-43-9	
Calcium	**100**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 11:58	7440-70-2	
Copper	**0.017**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:17	7440-50-8	
Iron	**0.014J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:17	7439-89-6	
Lead	**0.00056**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:17	7439-92-1	
Magnesium	**28.0**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 11:58	7439-95-4	
Manganese	**0.43**	mg/L	0.00050	0.00018	1	08/15/13 12:09	08/26/13 17:17	7439-96-5	
Potassium	**8.0**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:17	7440-09-7	
Silica	**19.1**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 11:58	7631-86-9	
Silver	**0.00010J**	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:17	7440-22-4	B
Sodium	**47.0**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 11:58	7440-23-5	
Total Hardness by 2340B	**366**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 11:58		
Uranium-238	**0.0049**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:17	7440-61-1	
Zinc	**0.21**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:16	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-02-081213 **Lab ID: 10238388008** Collected: 08/12/13 13:42 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0079**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:22	7429-90-5	
Arsenic	**0.0024**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:22	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:22	7440-43-9	
Calcium	**98.9**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:03	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:22	7440-50-8	
Iron	**0.032J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:22	7439-89-6	
Lead	**0.00039**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:22	7439-92-1	
Magnesium	**27.2**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:03	7439-95-4	
Manganese	**0.53**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 12:03	7439-96-5	
Potassium	**7.9**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:22	7440-09-7	
Silica	**18.6**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:03	7631-86-9	
Silver	**0.000053J**	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:22	7440-22-4	B
Sodium	**46.0**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:03	7440-23-5	
Total Hardness by 2340B	**359**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:03		
Uranium-238	**0.0051**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:22	7440-61-1	
Zinc	**0.30**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:18	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-03-081213 **Lab ID: 10238388009** Collected: 08/12/13 13:44 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0064**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:27	7429-90-5	
Arsenic	**0.0024**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:27	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:27	7440-43-9	
Calcium	**97.9**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:08	7440-70-2	
Copper	**0.018**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:27	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:27	7439-89-6	
Lead	**0.00034**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:27	7439-92-1	
Magnesium	**27.3**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:08	7439-95-4	
Manganese	**0.59**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 12:08	7439-96-5	
Potassium	**7.7**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:27	7440-09-7	
Silica	**18.4**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:08	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:27	7440-22-4	
Sodium	**46.1**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:08	7440-23-5	
Total Hardness by 2340B	**357**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:08		
Uranium-238	**0.0049**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:27	7440-61-1	
Zinc	**0.26**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:21	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-04-081213 **Lab ID: 10238388010** Collected: 08/12/13 13:46 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0045**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:32	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:32	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:32	7440-43-9	
Calcium	**97.4**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:13	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:32	7440-50-8	
Iron	**0.011J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:32	7439-89-6	
Lead	**0.00017**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:32	7439-92-1	
Magnesium	**26.8**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:13	7439-95-4	
Manganese	**0.56**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 12:13	7439-96-5	
Potassium	**7.7**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:32	7440-09-7	
Silica	**18.6**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:13	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:32	7440-22-4	
Sodium	**46.1**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:13	7440-23-5	
Total Hardness by 2340B	**354**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:13		
Uranium-238	**0.0042**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:32	7440-61-1	
Zinc	**0.27**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:28	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-05-081213 **Lab ID: 10238388011** Collected: 08/12/13 13:48 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0052**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:38	7429-90-5	
Arsenic	**0.0027**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:38	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:38	7440-43-9	
Calcium	**96.7**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:18	7440-70-2	M1
Copper	**0.012**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:38	7440-50-8	
Iron	**0.012J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:38	7439-89-6	
Lead	**0.00017**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:38	7439-92-1	
Magnesium	**26.6**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:18	7439-95-4	
Manganese	**0.35**	mg/L	0.00050	0.00018	1	08/15/13 12:09	08/26/13 17:38	7439-96-5	
Potassium	**7.8**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:38	7440-09-7	
Silica	**17.4**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:18	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:38	7440-22-4	M1
Sodium	**46.6**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:18	7440-23-5	M1
Total Hardness by 2340B	**351**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:18		
Uranium-238	**0.0042**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:38	7440-61-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:31	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-06-081213 **Lab ID: 10238388012** Collected: 08/12/13 13:50 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.027**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:43	7429-90-5	
Arsenic	**0.0026**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:43	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:43	7440-43-9	
Calcium	**98.6**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:24	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:43	7440-50-8	
Iron	**0.045J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:43	7439-89-6	
Lead	**0.00065**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:43	7439-92-1	
Magnesium	**27.0**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:24	7439-95-4	
Manganese	**0.41**	mg/L	0.00050	0.00018	1	08/15/13 12:09	08/26/13 17:43	7439-96-5	
Potassium	**7.9**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:43	7440-09-7	
Silica	**18.0**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:24	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:43	7440-22-4	
Sodium	**46.7**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:24	7440-23-5	
Total Hardness by 2340B	**357**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:24		
Uranium-238	**0.0043**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:43	7440-61-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:33	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-07-081213 **Lab ID: 10238388013** Collected: 08/12/13 13:52 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0078**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:48	7429-90-5	
Arsenic	**0.0023**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:48	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:48	7440-43-9	
Calcium	**104**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:29	7440-70-2	
Copper	**0.011**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:48	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:48	7439-89-6	
Lead	**0.00032**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:48	7439-92-1	
Magnesium	**28.5**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:29	7439-95-4	
Manganese	**0.49**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 12:29	7439-96-5	
Potassium	**8.1**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:48	7440-09-7	
Silica	**19.0**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:29	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:48	7440-22-4	
Sodium	**49.5**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:29	7440-23-5	
Total Hardness by 2340B	**376**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:29		
Uranium-238	**0.0044**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:48	7440-61-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:36	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-08-081213 **Lab ID: 10238388014** Collected: 08/12/13 13:54 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0038J**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:53	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:53	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:53	7440-43-9	
Calcium	**104**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 12:34	7440-70-2	
Copper	**0.011**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:53	7440-50-8	
Iron	**0.011J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:53	7439-89-6	
Lead	**0.00014**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:53	7439-92-1	
Magnesium	**28.6**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 12:34	7439-95-4	
Manganese	**0.49**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 12:34	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:53	7440-09-7	
Silica	**19.6**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 12:34	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:53	7440-22-4	
Sodium	**50.8**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 12:34	7440-23-5	
Total Hardness by 2340B	**379**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 12:34		
Uranium-238	**0.0038**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:53	7440-61-1	
Zinc	**0.22**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:38	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-09-081213 **Lab ID: 10238388015** Collected: 08/12/13 13:56 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.023**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 17:58	7429-90-5	
Arsenic	**0.0024**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 17:58	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 17:58	7440-43-9	
Calcium	**103**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 13:11	7440-70-2	
Copper	**0.018**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 17:58	7440-50-8	
Iron	**0.070**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 17:58	7439-89-6	
Lead	**0.0010**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 17:58	7439-92-1	
Magnesium	**28.8**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 13:11	7439-95-4	
Manganese	**0.63**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 13:11	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 17:58	7440-09-7	
Silica	**18.7**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 13:11	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 17:58	7440-22-4	
Sodium	**49.5**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 13:11	7440-23-5	
Total Hardness by 2340B	**376**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 13:11		
Uranium-238	**0.0041**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 17:58	7440-61-1	
Zinc	**0.32**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 17:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:40	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-10-081213 **Lab ID: 10238388016** Collected: 08/12/13 13:58 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0054**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 18:26	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 18:26	7440-38-2	
Cadmium	**0.00091**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 18:26	7440-43-9	
Calcium	**94.1**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 13:16	7440-70-2	
Copper	**0.0096**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 18:26	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 18:26	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 18:26	7439-92-1	
Magnesium	**26.2**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 13:16	7439-95-4	
Manganese	**0.36**	mg/L	0.00050	0.00018	1	08/15/13 12:09	08/26/13 18:26	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 18:26	7440-09-7	
Silica	**16.6**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 13:16	7631-86-9	
Silver	**0.00010J**	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 18:26	7440-22-4	B
Sodium	**45.6**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 13:16	7440-23-5	
Total Hardness by 2340B	**343**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 13:16		
Uranium-238	**0.0030**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 18:26	7440-61-1	
Zinc	**0.11**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 18:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:43	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-11-081213 **Lab ID: 10238388017** Collected: 08/12/13 14:00 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0041**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 18:31	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 18:31	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 18:31	7440-43-9	
Calcium	**107**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 13:21	7440-70-2	
Copper	**0.010**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 18:31	7440-50-8	
Iron	**0.024J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 18:31	7439-89-6	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 18:31	7439-92-1	
Magnesium	**30.9**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 13:21	7439-95-4	
Manganese	**0.58**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 13:21	7439-96-5	
Potassium	**8.5**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 18:31	7440-09-7	
Silica	**18.8**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 13:21	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 18:31	7440-22-4	
Sodium	**52.8**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 13:21	7440-23-5	
Total Hardness by 2340B	**394**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 13:21		
Uranium-238	**0.0028**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 18:31	7440-61-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 18:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:50	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-12-081213 **Lab ID: 10238388018** Collected: 08/12/13 14:02 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0033J**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 18:36	7429-90-5	
Arsenic	**0.0015**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 18:36	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 18:36	7440-43-9	
Calcium	**105**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 13:26	7440-70-2	
Copper	**0.0092**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 18:36	7440-50-8	
Iron	**0.019J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 18:36	7439-89-6	
Lead	**0.000077J**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 18:36	7439-92-1	
Magnesium	**30.3**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 13:26	7439-95-4	
Manganese	**0.64**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 13:26	7439-96-5	
Potassium	**8.3**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 18:36	7440-09-7	
Silica	**19.3**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 13:26	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 18:36	7440-22-4	
Sodium	**52.3**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 13:26	7440-23-5	
Total Hardness by 2340B	**387**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 13:26		
Uranium-238	**0.0027**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 18:36	7440-61-1	
Zinc	**0.26**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 18:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:53	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-13-081213 **Lab ID: 10238388019** Collected: 08/12/13 14:04 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.029**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 18:41	7429-90-5	
Arsenic	**0.00013J**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 18:41	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 18:41	7440-43-9	
Calcium	**38.0**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 13:31	7440-70-2	
Copper	**0.00076**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 18:41	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 18:41	7439-89-6	
Lead	**0.000075J**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 18:41	7439-92-1	
Magnesium	**0.27**	mg/L	0.0050	0.0024	1	08/15/13 12:09	08/26/13 18:41	7439-95-4	
Manganese	**0.0030**	mg/L	0.00050	0.00018	1	08/15/13 12:09	08/26/13 18:41	7439-96-5	
Potassium	**0.94**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 18:41	7440-09-7	
Silica	**5.3**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 13:31	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 18:41	7440-22-4	
Sodium	**6.1**	mg/L	0.050	0.010	1	08/15/13 12:09	08/26/13 18:41	7440-23-5	
Total Hardness by 2340B	**95.9**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 13:31		
Uranium-238	ND	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 18:41	7440-61-1	
Zinc	**0.0031J**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 18:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:55	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Sample: LAO-BS-14-081213 **Lab ID: 10238388020** Collected: 08/12/13 14:06 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.028**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 18:46	7429-90-5	
Arsenic	**0.00020J**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 18:46	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 18:46	7440-43-9	
Calcium	**34.1**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 13:36	7440-70-2	
Copper	**0.00084**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 18:46	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 18:46	7439-89-6	
Lead	**0.000090J**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 18:46	7439-92-1	
Magnesium	**0.32**	mg/L	0.0050	0.0024	1	08/15/13 12:09	08/26/13 18:46	7439-95-4	
Manganese	**0.0062**	mg/L	0.00050	0.00018	1	08/15/13 12:09	08/26/13 18:46	7439-96-5	
Potassium	**0.95**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 18:46	7440-09-7	
Silica	**5.7**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 13:36	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 18:46	7440-22-4	
Sodium	**6.3**	mg/L	0.050	0.010	1	08/15/13 12:09	08/26/13 18:46	7440-23-5	
Total Hardness by 2340B	**86.6**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 13:36		
Uranium-238	ND	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 18:46	7440-61-1	
Zinc	**0.0063**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 18:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:58	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

QC Batch: MERP/9048 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10238388007, 10238388008, 10238388009, 10238388010, 10238388011, 10238388012, 10238388013, 10238388014, 10238388015, 10238388016, 10238388017, 10238388018, 10238388019, 10238388020

METHOD BLANK: 1500933 — Matrix: Water
Associated Lab Samples: 10238388007, 10238388008, 10238388009, 10238388010, 10238388011, 10238388012, 10238388013, 10238388014, 10238388015, 10238388016, 10238388017, 10238388018, 10238388019, 10238388020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/20/13 12:46	

LABORATORY CONTROL SAMPLE: 1500934

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1500935 1500936

Parameter	Units	10238388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0053	102	107	85-115	5	20	

MATRIX SPIKE SAMPLE: 1500937

Parameter	Units	10238388020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0050	100	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

QC Batch: MPRP/41242 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10238388007, 10238388008, 10238388009, 10238388010, 10238388011, 10238388012, 10238388013, 10238388014, 10238388015, 10238388016, 10238388017, 10238388018, 10238388019, 10238388020

METHOD BLANK: 1501025 | Matrix: Water
Associated Lab Samples: 10238388007, 10238388008, 10238388009, 10238388010, 10238388011, 10238388012, 10238388013, 10238388014, 10238388015, 10238388016, 10238388017, 10238388018, 10238388019, 10238388020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	08/26/13 16:07	
Arsenic	mg/L	ND	0.00050	08/26/13 16:07	
Cadmium	mg/L	ND	0.000080	08/26/13 16:07	
Calcium	mg/L	0.0098J	0.020	08/26/13 16:07	
Copper	mg/L	ND	0.00050	08/26/13 16:07	
Iron	mg/L	ND	0.050	08/26/13 16:07	
Lead	mg/L	ND	0.00010	08/26/13 16:07	
Magnesium	mg/L	0.0025J	0.0050	08/26/13 16:07	
Manganese	mg/L	ND	0.00050	08/26/13 16:07	
Potassium	mg/L	ND	0.020	08/26/13 16:07	
Silver	mg/L	0.00012J	0.00050	08/26/13 16:07	
Sodium	mg/L	ND	0.050	08/26/13 16:07	
Uranium-238	mg/L	ND	0.00050	08/26/13 16:07	
Zinc	mg/L	ND	0.0050	08/26/13 16:07	

LABORATORY CONTROL SAMPLE: 1501026

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	103	85-115	
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.083	103	85-115	
Calcium	mg/L	1	1.1	106	85-115	
Copper	mg/L	.08	0.081	101	85-115	
Iron	mg/L	1	1.0	102	85-115	
Lead	mg/L	.08	0.084	104	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Manganese	mg/L	.08	0.083	103	85-115	
Potassium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.080	101	85-115	
Sodium	mg/L	1	1.0	104	85-115	
Uranium-238	mg/L	.08	0.082	103	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1501027 1501028

Parameter	Units	10238388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.027	.08	.08	0.11	0.12	109	122	70-130	9	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1501027 1501028

Parameter	Units	10238388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.014	.08	.08	0.10	0.10	109	109	70-130	.1	20	
Cadmium	mg/L	0.00013	.08	.08	0.087	0.086	108	107	70-130	1	20	
Calcium	mg/L	116	1	1	131	130	1440	1420	70-130	.2	20	E,M1
Copper	mg/L	0.012	.08	.08	0.10	0.10	113	111	70-130	1	20	
Iron	mg/L	0.045J	1	1	1.1	1.1	104	104	70-130	.2	20	
Lead	mg/L	0.0017	.08	.08	0.081	0.080	99	98	70-130	1	20	
Magnesium	mg/L	21.8	1	1	23.4	23.7	169	195	70-130	1	20	M1
Manganese	mg/L	0.035	.08	.08	0.12	0.12	106	104	70-130	1	20	
Potassium	mg/L	8.5	1	1	10.1	10	158	149	70-130	.9	20	M1
Silver	mg/L	0.000064J	.08	.08	0.033	0.034	41	42	70-130	2	20	M1
Sodium	mg/L	60.8	1	1	63.7	63.8	290	296	70-130	.09	20	E,M1
Uranium-238	mg/L	0.0013	.08	.08	0.083	0.082	103	101	70-130	1	20	
Zinc	mg/L	0.038	.08	.08	0.12	0.12	108	108	70-130	.2	20	

MATRIX SPIKE SAMPLE: 1501029

Parameter	Units	10238388011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.0052	.08	0.091	107	70-130	
Arsenic	mg/L	0.0027	.08	0.087	106	70-130	
Cadmium	mg/L	0.0011	.08	0.084	103	70-130	
Calcium	mg/L	96.7	1	110	1380	70-130	E,M1
Copper	mg/L	0.012	.08	0.092	101	70-130	
Iron	mg/L	0.012J	1	1.0	102	70-130	
Lead	mg/L	0.00017	.08	0.081	101	70-130	
Magnesium	mg/L	26.6	1	27.8	126	70-130	
Manganese	mg/L	0.35	.08	0.43	112	70-130	
Potassium	mg/L	7.8	1	9.0	121	70-130	
Silver	mg/L	ND	.08	0.031	38	70-130	M1
Sodium	mg/L	46.6	1	52.6	602	70-130	E,M1
Uranium-238	mg/L	0.0042	.08	0.086	103	70-130	
Zinc	mg/L	0.13	.08	0.22	109	70-130	

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QUALIFIERS

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

WORKORDER QUALIFIERS

WO: 10238388

[1]	The samples were received outside of required temperature range. Analysis was completed upon client approval.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands-Revised
Pace Project No.: 10238388

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10238388007	**LAO-BS-01-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388008	**LAO-BS-02-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388009	**LAO-BS-03-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388010	**LAO-BS-04-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388011	**LAO-BS-05-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388012	**LAO-BS-06-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388013	**LAO-BS-07-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388014	**LAO-BS-08-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388015	**LAO-BS-09-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388016	**LAO-BS-10-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388017	**LAO-BS-11-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388018	**LAO-BS-12-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388019	**LAO-BS-13-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388020	**LAO-BS-14-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388007	**LAO-BS-01-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388008	**LAO-BS-02-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388009	**LAO-BS-03-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388010	**LAO-BS-04-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388011	**LAO-BS-05-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388012	**LAO-BS-06-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388013	**LAO-BS-07-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388014	**LAO-BS-08-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388015	**LAO-BS-09-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388016	**LAO-BS-10-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388017	**LAO-BS-11-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388018	**LAO-BS-12-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388019	**LAO-BS-13-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388020	**LAO-BS-14-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344

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Laboratory Management Program LaMP Chain of Custody Record

bp rm

Page 1 of 3

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): 1125 1127

Rush TAT: Yes ___ No x

BP Facility No: LAO Wetlands (Monthly)

Lab Work Order Number: 10238388

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info.		Stage:	Activity:	Invoice To:	BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate+Nitrite	TDS/TSS/Alkalinity					Comments
	LAO-SS-1-080813	8/8/13	12:10		X			2	1	1	2				X	X	X	X							10238388001
	LAO-SS-1-081213	8/12/13	11:50		X			4	1	1	2				X	X	X	X	X	X					FIELD GRABS FOR SS-1, 002
	LAO-SS-1T-081213	8/12/13	11:54		X			3	1	1	1				X	X	X		X	X					SS-1T DUE TO 003
	LAO-SS-2-081213	8/12/13	12:12		X			3	1	1	1				X	X	X		X	X					SAMPLER MALFUNCTIONS 004
	LAO-SS-3-081213	8/12/13	12:30		X			3	1	1	1				X	X	X		X	X					005
	LAO-SS-4-081213	8/12/13	11:38		X			3	1	1	1				X	X	X		X	X					006

Sampler's Name: CJ KISSELL

Sampler's Company: Pioneer Technical Services

Shipment Method: FED EX Ship Date: 8/12/13

Shipment Tracking No: 5540 9197 7335

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] IPTS	8/12/13	13:20	[signature] PACE	8/13/13	902

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 8.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

1125 1127

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10238388

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-2~~				X						1				X										
	LAO-BS-01-081213	8/12/13	1340		X			1			1				X										10238388007
	LAO-BS-02-081213		1342		X			1			1				X										008
	LAO-BS-03-081213		1344		X			1			1				X										009
	LAO-BS-04-081213		1346		X			1			1				X										010
	LAO-BS-05-081213		1348		X			1			1				X										011
	LAO-BS-06-081213		1350		X			1			1				X										012
	LAO-BS-07-081213		1352		X			1			1				X										013

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Tom Hickey + CJ Kissell						
Sampler's Company: Pioneer Technical Services	IPTS	8/12/13	1320	PACE	8/13/13	902
Shipment Method: FedEx Ship Date: 8/12/13	IPTS	"	1320			
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 8.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
Req Due Date (mm/dd/yy): 1126 1127
Rush TAT: Yes ___ No x
BP Facility No: LAO Wetlands (Weekly)
Lab Work Order Number: 10238388

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-2~~				X						1				X										
	LAO-BS-08-081213	8/12/13	1354		X			1			1				X										10238388014
	LAO-BS-09-081213		1356		X			1			1				X										015
	LAO-BS-10-081213		1358		X			1			1				X										016
	LAO-BS-11-081213		~~1500~~ 1400		X			1			1				X										017
	LAO-BS-12-081213		1402		X			1			1				X										018
	LAO-BS-13-081213		1404		X			1			1				X										019
	LAO-BS-14-081213		1406		X			1			1				X										020

Sampler's Name: Tom Hulkey + CJ Kissell	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] IPTS	8/12/13	1320	[signature] PACE	8/13/13	9:02
Shipment Method: FedEx Ship Date: 8/12/13	[signature] IPTS	"	1320			
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 8.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10238388

10238388

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☐Commercial ☐Pace ☐Other:_____

Tracking Number: 5540 9197 7335

Custody Seal on Cooler/Box Present? ☒Yes ☐No **Seals Intact?** ☒Yes ☐No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐Bubble Wrap ☐Bubble Bags ☒None ☐Other:_____ **Temp Blank?** ☒Yes ☐No

Thermom. Used: ☒B88A912167504 ☐80512447 ☐72337080 **Type of Ice:** ☒Wet ☐Blue ☐None ☐Samples on ice, cooling process has begun

Cooler Temp Read (°C): 8.3 **Cooler Temp Corrected (°C):** 8.5 **Biological Tissue Frozen?** ☐Yes ☐No

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** 8/13/13

Comments:

Chain of Custody Present?	☒Yes	☐No	☐N/A	1.
Chain of Custody Filled Out?	☒Yes	☐No	☐N/A	2.
Chain of Custody Relinquished?	☒Yes	☐No	☐N/A	3.
Sampler Name and/or Signature on COC?	☒Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time?	☒Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No	☐N/A	6.
Rush Turn Around Time Requested?	☐Yes	☒No	☐N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒Yes	☐No	☐N/A	8.
Correct Containers Used?	☒Yes	☐No	☐N/A	9.
-Pace Containers Used?	☒Yes	☐No	☐N/A	
Containers Intact?	☒Yes	☐No	☐N/A	10.
Filtered Volume Received for Dissolved Tests?	☒Yes	☐No	☐N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒Yes	☒No	☐N/A	12. #1 COC 2 HNO3, 1 H2SO4, 1 BRIU ACTUAL 2 HNO3
All containers needing acid/base preservation have been checked?	☒Yes	☐No	☐N/A	13. ☒HNO_3 ☒H_2SO_4 ☐NaOH ☐HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒Yes	☐No	☐N/A	Sample # 1,2 2/2 2-5 1/1 5-18 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐Yes	☐No	☒N/A	14.
3 Trip Blanks Present?	☐Yes	☐No	☒N/A	15.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted: Brad H. Date/Time: 8/13/13

Comments/Resolution: -OK to proceed out of temp.

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 10:15	Temp: 8.3	Corrected Temp: 8.5	
Time: 10:30	put in cooler 8.3	8.5	
Time:	Temp:	Corrected Temp:	

Project Manager Review: _____ **Date:** 8/13/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 31, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 27, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 12/30/13 to add additional metals per the clients request to sample 002.

This report was revised on 1/31/14 to add additional metals per the clients request to sample 003.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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(612)607-1700

CERTIFICATIONS

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10239934001	**LAO-SS-1-082213**	Water	08/22/13 10:20	08/27/13 09:15
10239934002	**LAO-SS-1-082613**	Water	08/26/13 10:30	08/27/13 09:15
10239934003	**LAO-SS-2-082613**	Water	08/26/13 10:35	08/27/13 09:15

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(612)607-1700

SAMPLE ANALYTE COUNT

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10239934001	**LAO-SS-1-082213**	EPA 200.8	RB1, TT3	12	PASI-M
		EPA 245.1	YT1	1	PASI-M
10239934002	**LAO-SS-1-082613**	EPA 200.8	RB1, TT3	16	PASI-M
		EPA 245.1	YT1	1	PASI-M
10239934003	**LAO-SS-2-082613**	EPA 200.8	RB1, TT3	16	PASI-M
		EPA 245.1	YT1	1	PASI-M

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 31, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41570

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10239934001,10240268028

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1513518)
  - Magnesium
  - Silver
  - Sodium
- MS (Lab ID: 1513520)
  - Aluminum
  - Calcium
  - Iron
  - Magnesium
  - Sodium
- MSD (Lab ID: 1513519)
  - Silver
  - Sodium

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 31, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41570

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1513518)
  - Calcium
  - Sodium
- MSD (Lab ID: 1513519)
  - Calcium
  - Sodium

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 31, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Sample: LAO-SS-1-082213 **Lab ID: 10239934001** Collected: 08/22/13 10:20 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.036**	mg/L	0.0040	0.0015	1	09/03/13 10:49	09/04/13 19:37	7429-90-5	
Arsenic	**0.0077**	mg/L	0.00050	0.000093	1	09/03/13 10:49	09/04/13 19:37	7440-38-2	
Cadmium	**0.00037**	mg/L	0.000080	0.000032	1	09/03/13 10:49	09/04/13 19:37	7440-43-9	
Calcium	**143**	mg/L	0.40	0.20	20	09/03/13 10:49	09/09/13 13:10	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	09/03/13 10:49	09/04/13 19:37	7440-50-8	
Iron	**0.066**	mg/L	0.050	0.0059	1	09/03/13 10:49	09/04/13 19:37	7439-89-6	
Lead	**0.0013**	mg/L	0.00010	0.000046	1	09/03/13 10:49	09/04/13 19:37	7439-92-1	
Magnesium	**19.4**	mg/L	0.0050	0.0024	1	09/03/13 10:49	09/04/13 19:37	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	09/03/13 10:49	09/10/13 11:41	7440-22-4	M1
Total Hardness by 2340B	**436**	mg/L	1.4	0.71	20	09/03/13 10:49	09/09/13 13:10		
Uranium-238	**0.0015**	mg/L	0.00050	0.00010	1	09/03/13 10:49	09/04/13 19:37	7440-61-1	
Zinc	**0.071**	mg/L	0.0050	0.00098	1	09/03/13 10:49	09/04/13 19:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/05/13 08:17	09/06/13 10:01	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Sample: LAO-SS-1-082613 **Lab ID: 10239934002** Collected: 08/26/13 10:30 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.063**	mg/L	0.0040	0.0015	1	09/03/13 10:49	09/04/13 19:48	7429-90-5	
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	09/03/13 10:49	09/04/13 19:48	7440-38-2	
Cadmium	**0.00029**	mg/L	0.000080	0.000032	1	09/03/13 10:49	09/04/13 19:48	7440-43-9	
Calcium	**132**	mg/L	0.40	0.20	20	09/03/13 10:49	09/09/13 13:20	7440-70-2	
Copper	**0.026**	mg/L	0.00050	0.00017	1	09/03/13 10:49	09/04/13 19:48	7440-50-8	
Iron	**0.12**	mg/L	0.050	0.0059	1	09/03/13 10:49	09/04/13 19:48	7439-89-6	
Lead	**0.0024**	mg/L	0.00010	0.000046	1	09/03/13 10:49	09/04/13 19:48	7439-92-1	
Magnesium	**25.0**	mg/L	0.025	0.012	5	09/03/13 10:49	09/04/13 19:53	7439-95-4	
Manganese	**0.068**	mg/L	0.00050	0.00018	1	09/03/13 10:49	09/04/13 19:48	7439-96-5	
Potassium	**8.9**	mg/L	0.020	0.0047	1	09/03/13 10:49	09/04/13 19:48	7440-09-7	
Silica	**18.2**	mg/L	0.27	0.13	5	09/03/13 10:49	09/04/13 19:53	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/03/13 10:49	09/10/13 11:46	7440-22-4	
Sodium	**57.3**	mg/L	0.25	0.051	5	09/03/13 10:49	09/04/13 19:53	7440-23-5	
Total Hardness by 2340B	**431**	mg/L	1.4	0.71	20	09/03/13 10:49	09/09/13 13:20		
Uranium-238	**0.0018**	mg/L	0.00050	0.00010	1	09/03/13 10:49	09/04/13 19:48	7440-61-1	
Zinc	**0.081**	mg/L	0.0050	0.00098	1	09/03/13 10:49	09/04/13 19:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/05/13 08:17	09/06/13 10:04	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Sample: LAO-SS-2-082613 **Lab ID: 10239934003** Collected: 08/26/13 10:35 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.12**	mg/L	0.0040	0.0015	1	09/03/13 10:49	09/04/13 19:58	7429-90-5	
Arsenic	**0.053**	mg/L	0.00050	0.000093	1	09/03/13 10:49	09/04/13 19:58	7440-38-2	
Cadmium	**0.022**	mg/L	0.000080	0.000032	1	09/03/13 10:49	09/04/13 19:58	7440-43-9	
Calcium	**134**	mg/L	0.40	0.20	20	09/03/13 10:49	09/09/13 13:30	7440-70-2	
Copper	**0.65**	mg/L	0.0025	0.00087	5	09/03/13 10:49	09/04/13 20:04	7440-50-8	
Iron	**3.8**	mg/L	0.050	0.0059	1	09/03/13 10:49	09/04/13 19:58	7439-89-6	
Lead	**0.0029**	mg/L	0.00010	0.000046	1	09/03/13 10:49	09/04/13 19:58	7439-92-1	
Magnesium	**31.3**	mg/L	0.025	0.012	5	09/03/13 10:49	09/04/13 20:04	7439-95-4	
Manganese	**4.3**	mg/L	0.010	0.0037	20	09/03/13 10:49	09/09/13 13:30	7439-96-5	
Potassium	**8.6**	mg/L	0.020	0.0047	1	09/03/13 10:49	09/04/13 19:58	7440-09-7	
Silica	**27.6**	mg/L	1.1	0.54	20	09/03/13 10:49	09/09/13 13:30	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/03/13 10:49	09/10/13 11:51	7440-22-4	
Sodium	**55.4**	mg/L	0.25	0.051	5	09/03/13 10:49	09/04/13 20:04	7440-23-5	
Total Hardness by 2340B	**465**	mg/L	1.4	0.71	20	09/03/13 10:49	09/09/13 13:30		
Uranium-238	**0.010**	mg/L	0.00050	0.00010	1	09/03/13 10:49	09/04/13 19:58	7440-61-1	
Zinc	**5.9**	mg/L	0.10	0.020	20	09/03/13 10:49	09/09/13 13:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/05/13 08:17	09/06/13 10:11	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

QC Batch: MERP/9148 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10239934001, 10239934002, 10239934003

METHOD BLANK: 1513555 Matrix: Water
Associated Lab Samples: 10239934001, 10239934002, 10239934003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/06/13 09:56	

LABORATORY CONTROL SAMPLE: 1513556

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1513557 1513558

Parameter	Units	10239934002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0050	0.0050	101	100	85-115	1	20	

MATRIX SPIKE SAMPLE: 1513559

Parameter	Units	10240268030 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00021	.005	0.0053	103	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

QC Batch: MPRP/41570 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10239934001, 10239934002, 10239934003

METHOD BLANK: 1513516 Matrix: Water
Associated Lab Samples: 10239934001, 10239934002, 10239934003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0016J	0.0040	09/04/13 19:32	
Arsenic	mg/L	ND	0.00050	09/04/13 19:32	
Cadmium	mg/L	ND	0.000080	09/04/13 19:32	
Calcium	mg/L	0.011J	0.020	09/04/13 19:32	
Copper	mg/L	ND	0.00050	09/04/13 19:32	
Iron	mg/L	ND	0.050	09/04/13 19:32	
Lead	mg/L	ND	0.00010	09/04/13 19:32	
Magnesium	mg/L	ND	0.0050	09/04/13 19:32	
Manganese	ug/L	ND	0.50	09/04/13 19:32	
Potassium	ug/L	ND	20.0	09/04/13 19:32	
Silver	mg/L	0.00010J	0.00050	09/10/13 11:31	
Sodium	ug/L	ND	50.0	09/04/13 19:32	
Uranium-238	mg/L	ND	0.00050	09/04/13 19:32	
Zinc	mg/L	ND	0.0050	09/04/13 19:32	

LABORATORY CONTROL SAMPLE: 1513517

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.079	98	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Calcium	mg/L	1	0.99	99	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.1	105	85-115	
Lead	mg/L	.08	0.084	105	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Manganese	ug/L	80	83.6	105	85-115	
Potassium	ug/L	1000	992	99	85-115	
Silver	mg/L	.08	0.080	100	85-115	
Sodium	ug/L	1000	1000	100	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1513518 1513519

Parameter	Units	10239934001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.036	.08	.08	0.12	0.12	105	111	70-130	4	20	
Arsenic	mg/L	0.0077	.08	.08	0.093	0.093	107	107	70-130	.3	20	
Cadmium	mg/L	0.00037	.08	.08	0.085	0.086	106	107	70-130	.8	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1513518 1513519

Parameter	Units	10239934001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	143	1	1	143	143	88	86	70-130	.01	20	E
Copper	mg/L	0.013	.08	.08	0.097	0.097	105	105	70-130	.2	20	
Iron	mg/L	0.066	1	1	1.1	1.1	105	106	70-130	.4	20	
Lead	mg/L	0.0013	.08	.08	0.087	0.085	107	105	70-130	2	20	
Magnesium	mg/L	19.4	1	1	20.7	20.6	132	120	70-130	.6	20	M1
Manganese	ug/L	68.2	80	80	153	153	106	106	70-130	.1	20	
Potassium	ug/L	9170	1000	1000	10200	10100	105	95	70-130	1	20	
Silver	mg/L	ND	.08	.08	0.029	0.031	36	38	70-130	6	20	M1
Sodium	ug/L	58100	1000	1000	70900	70700	1280	1260	70-130	.3	20	E,M1
Uranium-238	mg/L	0.0015	.08	.08	0.085	0.085	104	104	70-130	.2	20	
Zinc	mg/L	0.071	.08	.08	0.16	0.16	111	108	70-130	1	20	

MATRIX SPIKE SAMPLE: 1513520

Parameter	Units	10240268028 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.52	.08	1.0	651	70-130	M1
Arsenic	mg/L	0.0089	.08	0.093	105	70-130	
Cadmium	mg/L	0.00042	.08	0.087	108	70-130	
Calcium	mg/L	39100 ug/L	1	40.7	160	70-130	M1
Copper	mg/L	0.042	.08	0.13	111	70-130	
Iron	mg/L	0.64	1	2.1	142	70-130	M1
Lead	mg/L	0.027	.08	0.12	111	70-130	
Magnesium	mg/L	9410 ug/L	1	10.8	135	70-130	M1
Manganese	ug/L	209	80	305	120	70-130	
Potassium	ug/L	3670	1000	4660	100	70-130	
Silver	mg/L	ND	.08	0.076	95	70-130	
Sodium	ug/L	14200	1000	14800	60	70-130	M1
Uranium-238	mg/L	5.0 ug/L	.08	0.088	104	70-130	
Zinc	mg/L	0.13	.08	0.23	123	70-130	

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QUALIFIERS

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands-Revised2
Pace Project No.: 10239934

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10239934001	**LAO-SS-1-082213**	EPA 200.8	MPRP/41570	EPA 200.8	ICPM/17448
10239934002	**LAO-SS-1-082613**	EPA 200.8	MPRP/41570	EPA 200.8	ICPM/17448
10239934003	**LAO-SS-2-082613**	EPA 200.8	MPRP/41570	EPA 200.8	ICPM/17448
10239934001	**LAO-SS-1-082213**	EPA 245.1	MERP/9148	EPA 245.1	MERC/10471
10239934002	**LAO-SS-1-082613**	EPA 245.1	MERP/9148	EPA 245.1	MERC/10471
10239934003	**LAO-SS-2-082613**	EPA 245.1	MERP/9148	EPA 245.1	MERC/10471

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

10239934

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): 1127

Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number:

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-082213	8/22/13	10:20		X						2				X			X						001
	LAO-SS-1-082613	8/26/13	10:30		X						2				X			X						002
	LAO-SS-2-082613	8/26/13	10:35		X						1				X									003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell						
Sampler's Company: Pioneer Technical Services	CJ Kissell / PTS	8/26/13	1420	AA / Pace	8/27/13	9:15
Shipment Method: FED EX Ship Date: 8/26/13						
Shipment Tracking No: 5540 9197 7313						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 9.4 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10239934

10239934

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: 5540 9197 7313

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 8.9 **Cooler Temp Corrected (°C):** 9.4 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.5 **Date and Initials of Person Examining Contents:** AM 8/27/13

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1/1 LAO-SS-1-082213, LAO-SS-1-082613 LAO-SS-1 082613
Per method, VOA pH is checked after analysis				Initial when completed: AM Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 10:10	Temp: 8.9	Corrected Temp: 9.4
Time: 10:21	put in cooler	
Time:	Temp:	Corrected Temp:

T° OK metals only

Project Manager Review: _____ **Date:** 8/27/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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January 16, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory on August 27, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/16/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request.
Samples effected: 012

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10239936001	**SD0623-082213**	Water	08/26/13 10:28	08/27/13 09:15
10239936002	**SD0624-082213**	Water	08/26/13 10:33	08/27/13 09:15
10239936003	**SD0625-082213**	Water	08/26/13 10:38	08/27/13 09:15
10239936004	**SD0626-082213**	Water	08/26/13 10:42	08/27/13 09:15
10239936005	**SD0627-082213**	Water	08/26/13 10:46	08/27/13 09:15
10239936006	**SD0628-082213**	Water	08/26/13 10:54	08/27/13 09:15
10239936007	**SD0629-082213**	Water	08/26/13 11:01	08/27/13 09:15
10239936008	**SD0630-082213**	Water	08/26/13 11:07	08/27/13 09:15
10239936009	**SD0631-082213**	Water	08/26/13 11:12	08/27/13 09:15
10239936010	**SD0632-082213**	Water	08/26/13 11:18	08/27/13 09:15
10239936011	**SD0633-082213**	Water	08/26/13 11:23	08/27/13 09:15
10239936012	**SD0634-082213**	Water	08/26/13 11:29	08/27/13 09:15
10239936013	**SD0635-082213**	Water	08/26/13 11:37	08/27/13 09:15
10239936014	**SD0636-082213**	Water	08/26/13 11:41	08/27/13 09:15
10239936015	**SD0637-082213**	Water	08/26/13 11:46	08/27/13 09:15
10239936016	**SD0638-082213**	Water	08/26/13 11:51	08/27/13 09:15

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10239936001	**SD0623-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10239936002	**SD0624-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936003	**SD0625-082213**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936004	**SD0626-082213**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936005	**SD0627-082213**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936006	**SD0628-082213**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936007	**SD0629-082213**	EPA 200.8	RB1	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936008	**SD0630-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936009	**SD0631-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936010	**SD0632-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936011	**SD0633-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10239936012	**SD0634-082213**	EPA 200.8	AJM, RB1	12
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	AAD	1
		SM 4500-NO3 H	MWD	2

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10239936013	**SD0635-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10239936014	**SD0636-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10239936015	**SD0637-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10239936016	**SD0638-082213**	EPA 200.8	AJM, RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	YT1	1
		EPA 245.1	YT1	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
16 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41509

B: Analyte was detected in the associated method blank.

- BLANK for HBN 265778 [MPRP/415 (Lab ID: 1511670)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41509

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10239463001,10239936016

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1511674)
  - Copper
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 16, 2014

Analyte Comments:

QC Batch: MPRP/41509

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1511674)
  - Copper
  - Zinc

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
16 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
16 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
16 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
1 sample was analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0634-082213 (Lab ID: 10239936012)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
15 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0634-082213 (Lab ID: 10239936012)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
1 sample was analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0634-082213 (Lab ID: 10239936012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
15 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
1 sample was analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0634-082213 (Lab ID: 10239936012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 16, 2014

General Information:
1 sample was analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0634-082213 (Lab ID: 10239936012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0623-082213 **Lab ID: 10239936001** Collected: 08/26/13 10:28 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.051**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 14:59	7440-38-2	
Cadmium	**0.0044**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 14:59	7440-43-9	
Copper	**0.63**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/05/13 09:38	7440-50-8	
Lead	**0.42**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 14:59	7439-92-1	
Zinc	**1.7**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 09:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0085**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 09:48	7440-38-2	
Cadmium, Dissolved	**0.0011**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 09:48	7440-43-9	
Copper, Dissolved	**0.14**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 09:48	7440-50-8	
Lead, Dissolved	**0.0026**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 09:48	7439-92-1	
Zinc, Dissolved	**0.33**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 09:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00039**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 08:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 07:44	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**337**	mg/L	20.0	10.0	1		08/28/13 11:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.7**	mg/L	2.5	1.2	1		08/29/13 11:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0624-082213 **Lab ID: 10239936002** Collected: 08/26/13 10:33 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.060**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 15:11	7440-38-2	
Cadmium	**0.0054**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 15:11	7440-43-9	
Copper	**0.76**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/05/13 09:41	7440-50-8	
Lead	**0.54**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/05/13 09:41	7439-92-1	
Zinc	**2.1**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 09:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0088**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:00	7440-38-2	
Cadmium, Dissolved	**0.0012**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:00	7440-43-9	
Copper, Dissolved	**0.16**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:00	7440-50-8	
Lead, Dissolved	**0.0026**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:00	7439-92-1	
Zinc, Dissolved	**0.34**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00046**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 08:55	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 07:46	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**428**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**20.0**	mg/L	2.5	1.2	1		08/29/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0625-082213 **Lab ID: 10239936003** Collected: 08/26/13 10:38 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.094**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 15:56	7440-38-2	
Cadmium	**0.0094**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 15:56	7440-43-9	
Copper	**1.2**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/03/13 16:03	7440-50-8	
Lead	**1.2**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/03/13 16:03	7439-92-1	
Zinc	**3.5**	mg/L	0.10	0.020	20	08/28/13 13:49	09/03/13 16:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:05	7440-38-2	
Cadmium, Dissolved	**0.0014**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:05	7440-43-9	
Copper, Dissolved	**0.18**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:05	7440-50-8	
Lead, Dissolved	**0.0036**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:05	7439-92-1	
Zinc, Dissolved	**0.34**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00078**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 08:57	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 07:54	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**88.3**	mg/L	3.3	1.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.0**	mg/L	2.5	1.2	1		08/29/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0626-082213 **Lab ID: 10239936004** Collected: 08/26/13 10:42 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.072**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 16:14	7440-38-2	
Cadmium	**0.0091**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 16:14	7440-43-9	
Copper	**1.1**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/03/13 16:20	7440-50-8	
Lead	**0.90**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/03/13 16:20	7439-92-1	
Zinc	**3.0**	mg/L	0.10	0.020	20	08/28/13 13:49	09/03/13 16:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0099**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:20	7440-38-2	
Cadmium, Dissolved	**0.0013**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:20	7440-43-9	
Copper, Dissolved	**0.18**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:20	7440-50-8	
Lead, Dissolved	**0.0035**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:20	7439-92-1	
Zinc, Dissolved	**0.33**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00096**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:05	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 07:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**856**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.9**	mg/L	2.5	1.2	1		08/29/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0627-082213 **Lab ID: 10239936005** Collected: 08/26/13 10:46 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 16:30	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 16:30	7440-43-9	
Copper	**0.00021J**	mg/L	0.00050	0.00017	1	08/28/13 13:49	09/03/13 16:30	7440-50-8	
Lead	**0.000070J**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 16:30	7439-92-1	
Zinc	**0.0017J**	mg/L	0.0050	0.00098	1	08/28/13 13:49	09/03/13 16:30	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:25	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:25	7440-43-9	
Copper, Dissolved	**0.00046J**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:25	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:25	7439-92-1	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:07	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		08/29/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0628-082213 **Lab ID: 10239936006** Collected: 08/26/13 10:54 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 16:40	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 16:40	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	08/28/13 13:49	09/03/13 16:40	7440-50-8	
Lead	**0.28**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 16:40	7439-92-1	
Zinc	**0.47**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/03/13 16:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0076**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:31	7440-38-2	
Cadmium, Dissolved	**0.00073**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:31	7440-43-9	
Copper, Dissolved	**0.082**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:31	7440-50-8	
Lead, Dissolved	**0.013**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:31	7439-92-1	
Zinc, Dissolved	**0.18**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00040**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000030J**	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:06	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**144**	mg/L	20.0	10.0	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**20.5**	mg/L	2.5	1.2	1		08/29/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0629-082213 **Lab ID: 10239936007** Collected: 08/26/13 11:01 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 17:08	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 17:08	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	08/28/13 13:49	09/03/13 17:08	7440-50-8	
Lead	**0.40**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 17:08	7439-92-1	
Zinc	**0.59**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/03/13 17:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0072**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:37	7440-38-2	
Cadmium, Dissolved	**0.00086**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:37	7440-43-9	
Copper, Dissolved	**0.066**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:37	7440-50-8	
Lead, Dissolved	**0.014**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:37	7439-92-1	
Zinc, Dissolved	**0.18**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00050**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:17	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:08	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**162**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.1**	mg/L	2.5	1.2	1		08/29/13 11:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0630-082213 **Lab ID: 10239936008** Collected: 08/26/13 11:07 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.039**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 17:19	7440-38-2	
Cadmium	**0.0036**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 17:19	7440-43-9	
Copper	**0.36**	mg/L	0.00050	0.00017	1	08/28/13 13:49	09/03/13 17:19	7440-50-8	
Lead	**1.0**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/05/13 09:44	7439-92-1	
Zinc	**1.5**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 09:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0062**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:43	7440-38-2	
Cadmium, Dissolved	**0.00077**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:43	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:43	7440-50-8	
Lead, Dissolved	**0.012**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:43	7439-92-1	
Zinc, Dissolved	**0.17**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0011**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:11	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**418**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.9**	mg/L	2.5	1.2	1		08/29/13 11:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0631-082213 **Lab ID: 10239936009** Collected: 08/26/13 11:12 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.041**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 17:31	7440-38-2	
Cadmium	**0.0044**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 17:31	7440-43-9	
Copper	**0.42**	mg/L	0.00050	0.00017	1	08/28/13 13:49	09/03/13 17:31	7440-50-8	
Lead	**1.0**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/05/13 09:47	7439-92-1	
Zinc	**1.7**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 09:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0067**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 10:57	7440-38-2	
Cadmium, Dissolved	**0.00092**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 10:57	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 10:57	7440-50-8	
Lead, Dissolved	**0.011**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 10:57	7439-92-1	
Zinc, Dissolved	**0.18**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 10:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:22	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**535**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.4**	mg/L	2.5	1.2	1		08/29/13 11:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0632-082213 **Lab ID: 10239936010** Collected: 08/26/13 11:18 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.045**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 17:43	7440-38-2	
Cadmium	**0.0049**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 17:43	7440-43-9	
Copper	**0.47**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/05/13 09:58	7440-50-8	
Lead	**1.1**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/05/13 09:58	7439-92-1	
Zinc	**1.9**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 09:58	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0065**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:02	7440-38-2	
Cadmium, Dissolved	**0.00081**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:02	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:02	7440-50-8	
Lead, Dissolved	**0.0098**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:02	7439-92-1	
Zinc, Dissolved	**0.18**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 11:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:24	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:16	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**621**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.0**	mg/L	2.5	1.2	1		08/29/13 11:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0633-082213 **Lab ID: 10239936011** Collected: 08/26/13 11:23 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.053**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 17:55	7440-38-2	
Cadmium	**0.0072**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 17:55	7440-43-9	
Copper	**0.66**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/03/13 18:01	7440-50-8	
Lead	**1.3**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/03/13 18:01	7439-92-1	
Zinc	**2.8**	mg/L	0.050	0.0098	10	08/28/13 13:49	09/05/13 10:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0070**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:08	7440-38-2	
Cadmium, Dissolved	**0.00066**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:08	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:08	7440-50-8	
Lead, Dissolved	**0.0084**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:08	7439-92-1	
Zinc, Dissolved	**0.15**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 11:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0018**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:27	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1020**	mg/L	33.3	16.7	1		08/30/13 11:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.2**	mg/L	2.5	1.2	1		08/29/13 11:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0634-082213 **Lab ID: 10239936012** Collected: 08/26/13 11:29 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.045**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 18:29	7440-38-2	
Cadmium	**0.0043**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 18:29	7440-43-9	
Calcium	**65.6**	mg/L	0.10	0.049	5	08/28/13 13:49	09/05/13 10:03	7440-70-2	
Copper	**0.55**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/05/13 10:03	7440-50-8	
Iron	**26.0**	mg/L	0.25	0.030	5	08/28/13 13:49	09/05/13 10:03	7439-89-6	
Lead	**0.56**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/05/13 10:03	7439-92-1	
Magnesium	**14.2**	mg/L	0.025	0.012	5	08/28/13 13:49	09/05/13 10:03	7439-95-4	
Manganese	**1.8**	mg/L	0.0025	0.00092	5	08/28/13 13:49	09/05/13 10:03	7439-96-5	
Potassium	**9.6**	mg/L	0.10	0.024	5	08/28/13 13:49	09/05/13 10:03	7440-09-7	
Silica	**108**	mg/L	0.27	0.13	5	08/28/13 13:49	09/05/13 10:03	7631-86-9	
Sodium	**6.4**	mg/L	0.25	0.051	5	08/28/13 13:49	09/05/13 10:03	7440-23-5	
Zinc	**1.9**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 10:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0071**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:14	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:14	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:14	7440-50-8	
Lead, Dissolved	**0.012**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:14	7439-92-1	
Zinc, Dissolved	**0.094**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 11:14	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00081**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:29	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:26	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**123**	mg/L	5.0	2.5	1		01/03/14 12:44		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**981**	mg/L	33.3	16.7	1		08/29/13 13:38		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.9**	Std. Units	0.10	0.050	1		01/15/14 15:54		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**0.064J**	mg/L	0.10	0.050	1		01/03/14 12:13	14797-55-8	H1
Nitrogen, NO2 plus NO3	**0.064J**	mg/L	0.10	0.050	1		01/03/14 12:13		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.0**	mg/L	2.5	1.2	1		08/29/13 11:47	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**12.3**	mg/L	2.0	1.0	1		01/02/14 14:18	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0634-082213 **Lab ID: 10239936012** Collected: 08/26/13 11:29 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:48	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0635-082213 **Lab ID: 10239936013** Collected: 08/26/13 11:37 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.035**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 18:41	7440-38-2	
Cadmium	**0.0046**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 18:41	7440-43-9	
Copper	**0.43**	mg/L	0.00050	0.00017	1	08/28/13 13:49	09/03/13 18:41	7440-50-8	
Lead	**0.39**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 18:41	7439-92-1	
Zinc	**2.0**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 10:06	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0073**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:19	7440-38-2	
Cadmium, Dissolved	**0.00068**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:19	7440-43-9	
Copper, Dissolved	**0.077**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:19	7440-50-8	
Lead, Dissolved	**0.0039**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:19	7439-92-1	
Zinc, Dissolved	**0.44**	mg/L	0.0050	0.00098	1	09/03/13 10:54	09/04/13 11:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00033**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:37	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**731**	mg/L	25.0	12.5	1		08/29/13 13:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**22.0**	mg/L	2.5	1.2	1		08/29/13 11:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0636-082213 **Lab ID: 10239936014** Collected: 08/26/13 11:41 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.059**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 18:53	7440-38-2	
Cadmium	**0.0082**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 18:53	7440-43-9	
Copper	**0.73**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/03/13 18:59	7440-50-8	
Lead	**0.80**	mg/L	0.00050	0.00023	5	08/28/13 13:49	09/03/13 18:59	7439-92-1	
Zinc	**3.8**	mg/L	0.050	0.0098	10	08/28/13 13:49	09/05/13 10:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0062**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:34	7440-38-2	
Cadmium, Dissolved	**0.00082**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:34	7440-43-9	
Copper, Dissolved	**0.060**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:34	7440-50-8	
Lead, Dissolved	**0.0028**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:34	7439-92-1	
Zinc, Dissolved	**0.47**	mg/L	0.025	0.0049	5	09/03/13 10:54	09/04/13 11:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00066**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:42	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1710**	mg/L	33.3	16.7	1		08/29/13 13:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.5**	mg/L	2.5	1.2	1		08/29/13 11:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0637-082213 **Lab ID: 10239936015** Collected: 08/26/13 11:46 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.048**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 19:10	7440-38-2	
Cadmium	**0.0065**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 19:10	7440-43-9	
Copper	**0.54**	mg/L	0.0025	0.00087	5	08/28/13 13:49	09/05/13 10:12	7440-50-8	
Lead	**0.33**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 19:10	7439-92-1	
Zinc	**1.5**	mg/L	0.025	0.0049	5	08/28/13 13:49	09/05/13 10:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0051**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:39	7440-38-2	
Cadmium, Dissolved	**0.00068**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:39	7440-43-9	
Copper, Dissolved	**0.13**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:39	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:39	7439-92-1	
Zinc, Dissolved	**0.49**	mg/L	0.025	0.0049	5	09/03/13 10:54	09/04/13 11:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00059**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:33	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1060**	mg/L	20.0	10.0	1		08/29/13 13:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**28.6**	mg/L	5.0	2.5	2		08/29/13 11:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Sample: SD0638-082213 **Lab ID: 10239936016** Collected: 08/26/13 11:51 Received: 08/27/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.17**	mg/L	0.00050	0.000093	1	08/28/13 13:49	09/03/13 19:42	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000032	1	08/28/13 13:49	09/03/13 19:42	7440-43-9	
Copper	**6.5**	mg/L	0.025	0.0087	50	08/28/13 13:49	09/05/13 10:15	7440-50-8	M1
Lead	**0.28**	mg/L	0.00010	0.000046	1	08/28/13 13:49	09/03/13 19:42	7439-92-1	
Zinc	**14.1**	mg/L	0.25	0.049	50	08/28/13 13:49	09/05/13 10:15	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0040**	mg/L	0.00050	0.000093	1	09/03/13 10:54	09/04/13 11:45	7440-38-2	
Cadmium, Dissolved	**0.0030**	mg/L	0.000080	0.000032	1	09/03/13 10:54	09/04/13 11:45	7440-43-9	
Copper, Dissolved	**0.29**	mg/L	0.00050	0.00017	1	09/03/13 10:54	09/04/13 11:45	7440-50-8	
Lead, Dissolved	**0.00020**	mg/L	0.00010	0.000046	1	09/03/13 10:54	09/04/13 11:45	7439-92-1	
Zinc, Dissolved	**2.6**	mg/L	0.050	0.0098	10	09/03/13 10:54	09/10/13 12:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00092**	mg/L	0.00020	0.000030	1	09/04/13 13:35	09/06/13 09:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/04/13 13:32	09/06/13 08:35	7439-97-6	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: MERP/9127 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

METHOD BLANK: 1511729 — Matrix: Water
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/06/13 08:48	

LABORATORY CONTROL SAMPLE: 1511730

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1511731 1511732

Parameter	Units	10239936003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00078	.005	.005	0.0058	0.0058	100	100	85-115	.9	20	

MATRIX SPIKE SAMPLE: 1516455

Parameter	Units	10239936013 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00033	.005	0.0054	101	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: MERP/9125 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

METHOD BLANK: 1511720 — Matrix: Water
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/06/13 07:39	

LABORATORY CONTROL SAMPLE: 1511721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	101	85-115	

MATRIX SPIKE SAMPLE: 1511724

Parameter	Units	10239936016 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1516453 — 1516454

Parameter	Units	10239936002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0050	0.0049	100	99	85-115	1	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: MPRP/41509 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

METHOD BLANK: 1511670 Matrix: Water
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/03/13 14:39	
Cadmium	mg/L	ND	0.000080	09/03/13 14:39	
Calcium	mg/L	ND	0.020	09/03/13 14:39	
Copper	mg/L	ND	0.00050	09/03/13 14:39	
Iron	mg/L	ND	0.050	09/03/13 14:39	
Lead	mg/L	ND	0.00010	09/03/13 14:39	
Magnesium	mg/L	ND	0.0050	09/03/13 14:39	
Manganese	mg/L	ND	0.00050	09/03/13 14:39	
Potassium	mg/L	ND	0.020	09/03/13 14:39	
Sodium	mg/L	ND	0.050	09/03/13 14:39	
Zinc	mg/L	0.0013J	0.0050	09/03/13 14:39	

LABORATORY CONTROL SAMPLE: 1511671

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.079	99	85-115	
Cadmium	mg/L	.08	0.080	100	85-115	
Calcium	mg/L	1	1.1	108	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.0	101	85-115	
Manganese	mg/L	.08	0.079	99	85-115	
Potassium	mg/L	1	0.94	94	85-115	
Sodium	mg/L	1	1.0	102	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1511672 1511673

Parameter	Units	10239463001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	1.4 ug/L	.08	.08	0.081	0.081	100	100	70-130	.2	20	
Cadmium	mg/L	0.039J ug/L	.08	.08	0.078	0.077	98	96	70-130	2	20	
Calcium	mg/L	56100 ug/L	1	1	57.5	57.2	139	107	70-130	.6	20	
Copper	mg/L	0.0036	.08	.08	0.083	0.082	99	98	70-130	.5	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1511672 1511673

Parameter	Units	10239463001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	1920 ug/L	1	1	3.4	3.3	143	139	70-130	1	20	
Lead	mg/L	2.4 ug/L	.08	.08	0.080	0.079	97	96	70-130	.8	20	
Magnesium	mg/L	38800 ug/L	1	1	40.0	40.3	127	155	70-130	.7	20	
Manganese	mg/L	49.9 ug/L	.08	.08	0.13	0.13	98	96	70-130	1	20	
Potassium	mg/L	7360 ug/L	1	1	8.6	8.6	127	121	70-130	.8	20	
Sodium	mg/L	240000 ug/L	1	1	241	243	110	230	70-130	.5	20	
Zinc	mg/L	14.1 ug/L	.08	.08	0.089	0.089	94	93	70-130	.7	20	

MATRIX SPIKE SAMPLE: 1511674

Parameter	Units	10239936016 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.17	.08	0.25	94	70-130	
Cadmium	mg/L	0.025	.08	0.10	97	70-130	
Calcium	mg/L	106000 ug/L	1	102	-364	70-130	
Copper	mg/L	6.5	.08	6.3	-169	70-130	E,M1
Iron	mg/L	47800 ug/L	1	43.2	-462	70-130	
Lead	mg/L	0.28	.08	0.37	114	70-130	
Magnesium	mg/L	28500 ug/L	1	28.1	-37	70-130	
Manganese	mg/L	1490 ug/L	.08	1.6	174	70-130	
Potassium	mg/L	14900 ug/L	1	15.6	75	70-130	
Sodium	mg/L	21800 ug/L	1	25.3	348	70-130	
Zinc	mg/L	14.1	.08	13.2	-1180	70-130	E,M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: MPRP/41510 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

METHOD BLANK: 1511677 — Matrix: Water
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015, 10239936016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/10/13 12:16	
Cadmium, Dissolved	mg/L	ND	0.000080	09/10/13 12:16	
Copper, Dissolved	mg/L	ND	0.00050	09/10/13 12:16	
Lead, Dissolved	mg/L	ND	0.00010	09/10/13 12:16	
Zinc, Dissolved	mg/L	0.0012J	0.0050	09/10/13 12:16	

LABORATORY CONTROL SAMPLE: 1511678

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.082	103	85-115	
Cadmium, Dissolved	mg/L	.08	0.086	108	85-115	
Copper, Dissolved	mg/L	.08	0.083	104	85-115	
Lead, Dissolved	mg/L	.08	0.085	106	85-115	
Zinc, Dissolved	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1511679 1511680

Parameter	Units	10239936001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0085	.08	.08	0.089	0.090	101	102	70-130	.8	20	
Cadmium, Dissolved	mg/L	0.0011	.08	.08	0.088	0.087	109	108	70-130	.7	20	
Copper, Dissolved	mg/L	0.14	.08	.08	0.23	0.23	109	109	70-130	.04	20	
Lead, Dissolved	mg/L	0.0026	.08	.08	0.085	0.087	103	105	70-130	2	20	
Zinc, Dissolved	mg/L	0.33	.08	.08	0.42	0.42	112	109	70-130	.6	20	

MATRIX SPIKE SAMPLE: 1511681

Parameter	Units	10239460001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.015	.08	0.094	99	70-130	
Cadmium, Dissolved	mg/L	0.00039	.08	0.085	106	70-130	
Copper, Dissolved	mg/L	0.00037J	.08	0.079	99	70-130	
Lead, Dissolved	mg/L	ND	.08	0.082	102	70-130	
Zinc, Dissolved	mg/L	0.0020J	.08	0.082	100	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WET/33876 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10239936012

METHOD BLANK: 1604009 — Matrix: Water
Associated Lab Samples: 10239936012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 — 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 — 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 — 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WET/31993 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10239936001

METHOD BLANK: 1511902 | Matrix: Water
Associated Lab Samples: 10239936001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/28/13 11:40	

METHOD BLANK: 1511905 | Matrix: Water
Associated Lab Samples: 10239936001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/28/13 11:41	

LABORATORY CONTROL SAMPLE: 1511901

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	90.6	91	80-120	

SAMPLE DUPLICATE: 1511903

Parameter	Units	10239403001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	746	758	2	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WET/32024 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10239936012, 10239936013, 10239936014, 10239936015

METHOD BLANK: 1513068 Matrix: Water
Associated Lab Samples: 10239936012, 10239936013, 10239936014, 10239936015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/29/13 13:37	

METHOD BLANK: 1516915 Matrix: Water
Associated Lab Samples: 10239936012, 10239936013, 10239936014, 10239936015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/29/13 13:38	

LABORATORY CONTROL SAMPLE: 1513069

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	86.6	87	80-120	

SAMPLE DUPLICATE: 1513070

Parameter	Units	10239918001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	89.3	88.3	1	10	

SAMPLE DUPLICATE: 1513071

Parameter	Units	10240015001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	5.9J		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WET/32048 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011

METHOD BLANK: 1514149 Matrix: Water
Associated Lab Samples: 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/30/13 11:36	

METHOD BLANK: 1514152 Matrix: Water
Associated Lab Samples: 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/30/13 11:36	

LABORATORY CONTROL SAMPLE: 1514150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	85.2	85	80-120	

SAMPLE DUPLICATE: 1514151

Parameter	Units	10239936005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WET/34003 | Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B | Analysis Description: 4500H+B pH
Associated Lab Samples: 10239936012

LABORATORY CONTROL SAMPLE: 1609098

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	100	98-102	H6

SAMPLE DUPLICATE: 1609099

Parameter	Units	10239936012 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.9	6.9	.3	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WETA/17057 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10239936012

METHOD BLANK: 1604003 | Matrix: Water
Associated Lab Samples: 10239936012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WETA/15899 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015

METHOD BLANK: 1511867 — Matrix: Water
Associated Lab Samples: 10239936001, 10239936002, 10239936003, 10239936004, 10239936005, 10239936006, 10239936007, 10239936008, 10239936009, 10239936010, 10239936011, 10239936012, 10239936013, 10239936014, 10239936015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	08/29/13 11:34	

LABORATORY CONTROL SAMPLE: 1511868

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1511869 — 1511870

Parameter	Units	10239056019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	3.3	20	20	23.0	22.9	99	98	80-120	.5	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1511871 — 1511872

Parameter	Units	10239936006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	20.5	20	20	38.6	39.1	91	93	80-120	1	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WETA/17041
QC Batch Method: SM 4500-Cl E
Analysis Method: SM 4500-Cl E
Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10239936012

METHOD BLANK: 1603873
Matrix: Water
Associated Lab Samples: 10239936012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

QC Batch: WETA/17023
QC Batch Method: SM 4500-NO2 B
Analysis Method: SM 4500-NO2 B
Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10239936012

METHOD BLANK: 1603178
Matrix: Water
Associated Lab Samples: 10239936012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10239936001	**SD0623-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936002	**SD0624-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936003	**SD0625-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936004	**SD0626-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936005	**SD0627-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936006	**SD0628-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936007	**SD0629-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936008	**SD0630-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936009	**SD0631-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936010	**SD0632-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936011	**SD0633-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936012	**SD0634-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936013	**SD0635-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936014	**SD0636-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936015	**SD0637-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936016	**SD0638-082213**	EPA 200.8	MPRP/41509	EPA 200.8	ICPM/17395
10239936001	**SD0623-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936002	**SD0624-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936003	**SD0625-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936004	**SD0626-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936005	**SD0627-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936006	**SD0628-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936007	**SD0629-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936008	**SD0630-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936009	**SD0631-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936010	**SD0632-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936011	**SD0633-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936012	**SD0634-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936013	**SD0635-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936014	**SD0636-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936015	**SD0637-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936016	**SD0638-082213**	EPA 200.8	MPRP/41510	EPA 200.8	ICPM/17439
10239936001	**SD0623-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936002	**SD0624-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936003	**SD0625-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936004	**SD0626-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936005	**SD0627-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936006	**SD0628-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936007	**SD0629-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936008	**SD0630-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936009	**SD0631-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936010	**SD0632-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936011	**SD0633-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936012	**SD0634-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936013	**SD0635-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936014	**SD0636-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936015	**SD0637-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468
10239936016	**SD0638-082213**	EPA 245.1	MERP/9127	EPA 245.1	MERC/10468

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10239936001	**SD0623-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936002	**SD0624-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936003	**SD0625-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936004	**SD0626-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936005	**SD0627-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936006	**SD0628-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936007	**SD0629-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936008	**SD0630-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936009	**SD0631-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936010	**SD0632-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936011	**SD0633-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936012	**SD0634-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936013	**SD0635-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936014	**SD0636-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936015	**SD0637-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936016	**SD0638-082213**	EPA 245.1	MERP/9125	EPA 245.1	MERC/10467
10239936012	**SD0634-082213**	SM 2320B	WET/33876		
10239936001	**SD0623-082213**	SM 2540D	WET/31993		
10239936002	**SD0624-082213**	SM 2540D	WET/32048		
10239936003	**SD0625-082213**	SM 2540D	WET/32048		
10239936004	**SD0626-082213**	SM 2540D	WET/32048		
10239936005	**SD0627-082213**	SM 2540D	WET/32048		
10239936006	**SD0628-082213**	SM 2540D	WET/32048		
10239936007	**SD0629-082213**	SM 2540D	WET/32048		
10239936008	**SD0630-082213**	SM 2540D	WET/32048		
10239936009	**SD0631-082213**	SM 2540D	WET/32048		
10239936010	**SD0632-082213**	SM 2540D	WET/32048		
10239936011	**SD0633-082213**	SM 2540D	WET/32048		
10239936012	**SD0634-082213**	SM 2540D	WET/32024		
10239936013	**SD0635-082213**	SM 2540D	WET/32024		
10239936014	**SD0636-082213**	SM 2540D	WET/32024		
10239936015	**SD0637-082213**	SM 2540D	WET/32024		
10239936012	**SD0634-082213**	SM 4500-H+B	WET/34003		
10239936012	**SD0634-082213**	SM 4500-NO3 H	WETA/17057		
10239936001	**SD0623-082213**	ASTM D516	WETA/15899		
10239936002	**SD0624-082213**	ASTM D516	WETA/15899		
10239936003	**SD0625-082213**	ASTM D516	WETA/15899		
10239936004	**SD0626-082213**	ASTM D516	WETA/15899		
10239936005	**SD0627-082213**	ASTM D516	WETA/15899		
10239936006	**SD0628-082213**	ASTM D516	WETA/15899		
10239936007	**SD0629-082213**	ASTM D516	WETA/15899		
10239936008	**SD0630-082213**	ASTM D516	WETA/15899		
10239936009	**SD0631-082213**	ASTM D516	WETA/15899		
10239936010	**SD0632-082213**	ASTM D516	WETA/15899		
10239936011	**SD0633-082213**	ASTM D516	WETA/15899		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10239936

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10239936012	**SD0634-082213**	ASTM D516	WETA/15899		
10239936013	**SD0635-082213**	ASTM D516	WETA/15899		
10239936014	**SD0636-082213**	ASTM D516	WETA/15899		
10239936015	**SD0637-082213**	ASTM D516	WETA/15899		
10239936012	**SD0634-082213**	SM 4500-Cl E	WETA/17041		
10239936012	**SD0634-082213**	SM 4500-NO2 B	WETA/17023		

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1156, 57

1023936

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0623-082213	8/26/2013	10:28		x			3	1		2				x	x	x								001
	SD0624-082213	8/26/2013	10:33		x			3	1		2				x	x	x								002
	SD0625-082213	8/26/2013	10:38		x			3	1		2				x	x	x								003
	SD0626-082213	8/26/2013	10:42		x			3	1		2				x	x	x								004
	SD0627-082213	8/26/2013	10:46		x			3	1		2				x	x	x								005
	SD0628-082213	8/26/2013	10:54		x			3	1		2				x	x	x								006
	SD0629-082213	8/26/2013	11:01		x			3	1		2				x	x	x								007
	SD0630-082213	8/26/2013	11:07		x			3	1		2				x	x	x								008
	SD0631-082213	8/26/2013	11:12		x			3	1		2				x	x	x								009
	SD0632-082213	8/26/2013	11:18		x			3	1		2				x	x	x								010

Sampler's Name:	Dan Cass	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	[signature] TREC	8/26/13	1403	TN/Pace	8/27/13	915
Shipment Method:	Fed Ex Ship Date: 8/26/2013						
Shipment Tracking No:	8006 6032 3492						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

2.6

1156 57

102399 36

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:		Consultant/Contractor:	TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:		Consultant/Contractor Project No:	9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:		Address:	1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:		Consultant/Contractor PM:	Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:		Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP X Contractor
BP Project Mar	Lindy Hanson				
BP PM Phone:	723-1838				
BP PM Email:	lindy.hansont@bp.com				

Report Type & QC Level
Standard ____
Full Data Package ____

Matrix / No. Containers / Preservative / Requested Analyses

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0633-082213	8/26/2013	11:23		x			3	1		2				x	x	x								011
	SD0634-082213	8/26/2013	11:29		x			3	1		2				x	x	x								012
	SD0635-082213	8/26/2013	11:37		x			3	1		2				x	x	x								013
	SD0636-082213	8/26/2013	11:41		x			3	1		2				x	x	x								014
	SD0637-082213	8/26/2013	11:46		x			3	1		2				x	x	x								015
	SD0638-082213	8/26/2013	11:51		x			2			2				x	x									016
			QCF		x			3	1		2				x	x	x								
			QCF		x			3	1		2				x	x	x								
			QCF		x			3	1		2				x	x	x								
			QCF		x			3	1		2				x	x	x								

Sampler's Name:	Dan Cass	**Relinquished By / Affiliation**	**Date**	**Time**	**Accepted By / Affiliation**	**Date**	**Time**
Sampler's Company:	TREC INC	TREC	8/26/13	1403	TN / Pace	82713	915
Shipment Method:	Fed Ex Ship Date: 8/26/2013						
Shipment Tracking No:	8006 6032 3492						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

2.6

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: SR. Trec

Project #: WO#: 10239936

10239936

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 7958 2048 9616 8006 6032 3492

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ 888A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.1, 2.1 **Cooler Temp Corrected (°C):** 1.6, 2.6 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.5 **Date and Initials of Person Examining Contents:** 8 27 13 TN

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # All 2/2
Per method, VOA pH is checked after analysis				Initial when completed: TN Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1034	Temp: 1.1, 2.1	Corrected Temp: 1.6, 2.6
Time: 1052	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 8/27/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory between August 29, 2013 and August 30, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request. Samples effected: 012 & 042.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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CERTIFICATIONS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10240339001	**SD0639-082613**	Water	08/28/13 10:11	08/29/13 09:14
10240339002	**SD0640-082613**	Water	08/28/13 10:16	08/29/13 09:14
10240339003	**SD0641-082613**	Water	08/28/13 10:20	08/29/13 09:14
10240339004	**SD0642-082613**	Water	08/28/13 10:25	08/29/13 09:14
10240339005	**SD0643-082613**	Water	08/28/13 10:29	08/29/13 09:14
10240339006	**SD0644-082613**	Water	08/28/13 10:32	08/29/13 09:14
10240339007	**SD0645-082613**	Water	08/28/13 10:36	08/29/13 09:14
10240339008	**SD0646-082613**	Water	08/28/13 10:39	08/29/13 09:14
10240339009	**SD0647-082613**	Water	08/28/13 10:42	08/29/13 09:14
10240339010	**SD0657-082613**	Water	08/28/13 11:19	08/29/13 09:14
10240339011	**SD0658-082613**	Water	08/28/13 11:22	08/29/13 09:14
10240339012	**SD0659-082613**	Water	08/28/13 11:25	08/29/13 09:14
10240339013	**SD0660-082613**	Water	08/28/13 11:31	08/29/13 09:14
10240339014	**SD0661-082613**	Water	08/28/13 11:34	08/29/13 09:14
10240339015	**SD0662-082613**	Water	08/28/13 11:38	08/29/13 09:14
10240339016	**SD0663-082613**	Water	08/28/13 11:42	08/29/13 09:14
10240339017	**SD0664-082613**	Water	08/28/13 11:45	08/29/13 09:14
10240339018	**SD0665-082613**	Water	08/28/13 11:48	08/29/13 09:14
10240339019	**SD0666-082613**	Water	08/28/13 11:52	08/29/13 09:14
10240339020	**SD0667-082613**	Water	08/28/13 11:56	08/29/13 09:14
10240339021	**SD0668-082613**	Water	08/28/13 11:59	08/29/13 09:14
10240339022	**SD0669-082613**	Water	08/28/13 12:03	08/29/13 09:14
10240339023	**SD0670-082613**	Water	08/28/13 12:07	08/29/13 09:14
10240339024	**SD0671-082613**	Water	08/28/13 12:10	08/29/13 09:14
10240339025	**SD0672-082613**	Water	08/28/13 12:13	08/29/13 09:14
10240339026	**SD0673-082613**	Water	08/28/13 12:16	08/29/13 09:14
10240339027	**SD0674-082613**	Water	08/28/13 12:20	08/29/13 09:14
10240339028	**SD0675-082613**	Water	08/28/13 12:27	08/29/13 09:14
10240339029	**SD0676-082613**	Water	08/28/13 12:31	08/29/13 09:14
10240339030	**SD0677-082613**	Water	08/28/13 12:34	08/29/13 09:14
10240339031	**SD0678-082613**	Water	08/28/13 12:39	08/29/13 09:14
10240339032	**SD0679-082613**	Water	08/28/13 12:42	08/29/13 09:14
10240339033	**SD0680-082613**	Water	08/28/13 12:45	08/29/13 09:14
10240339034	**SD0681-082613**	Water	08/28/13 12:48	08/29/13 09:14
10240339035	**SD0682-082613**	Water	08/28/13 12:52	08/29/13 09:14
10240339036	**SD0648-082613**	Water	08/28/13 10:45	08/30/13 09:15
10240339037	**SD0649-082613**	Water	08/28/13 10:49	08/30/13 09:15

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(612)607-1700

SAMPLE SUMMARY

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10240339038	**SD0650-082613**	Water	08/28/13 10:52	08/30/13 09:15
10240339039	**SD0651-082613**	Water	08/28/13 10:56	08/30/13 09:15
10240339040	**SD0652-082613**	Water	08/28/13 10:59	08/30/13 09:15
10240339041	**SD0653-082613**	Water	08/28/13 11:03	08/30/13 09:15
10240339042	**SD0654-082613**	Water	08/28/13 11:07	08/30/13 09:15
10240339043	**SD0655-082613**	Water	08/28/13 11:12	08/30/13 09:15
10240339044	**SD0656-082613**	Water	08/28/13 11:16	08/30/13 09:15

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10240339001	**SD0639-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339002	**SD0640-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339003	**SD0641-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339004	**SD0642-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339005	**SD0643-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339006	**SD0644-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339007	**SD0645-082613**	EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339008	**SD0646-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339009	**SD0647-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339010	**SD0657-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339011	**SD0658-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339012	**SD0659-082613**	EPA 200.8	AJM	11
		EPA 200.8	RB1	6
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	HNKH	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10240339013	**SD0660-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339014	**SD0661-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339015	**SD0662-082613**	EPA 200.8	RJS	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339016	**SD0663-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339017	**SD0664-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339018	**SD0665-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339019	**SD0666-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339020	**SD0667-082613**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339021	**SD0668-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339022	**SD0669-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240339023	**SD0670-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339024	**SD0671-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
10240339025	**SD0672-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339026	**SD0673-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339027	**SD0674-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339028	**SD0675-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339029	**SD0676-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339030	**SD0677-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10240339031	**SD0678-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339032	**SD0679-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339033	**SD0680-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339034	**SD0681-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339035	**SD0682-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339036	**SD0648-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339037	**SD0649-082613**	EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339038	**SD0650-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339039	**SD0651-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339040	**SD0652-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339041	**SD0653-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339042	**SD0654-082613**	EPA 200.8	AJM	12
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	LMF	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2

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SAMPLE ANALYTE COUNT

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10240339043	**SD0655-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1
10240339044	**SD0656-082613**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	LMF	1
		ASTM D516	KEO	1

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
44 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41576

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339001,10240339011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1513988)
  - Zinc

QC Batch: MPRP/41686

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339015,10240591005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1517881)
  - Copper

QC Batch: MPRP/41577

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339021,10240339032

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1513991)
  - Copper

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

QC Batch: MPRP/41577

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339021,10240339032

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1519251)
  - Zinc
- MSD (Lab ID: 1513992)
  - Copper
  - Lead
  - Zinc

QC Batch: MPRP/41595

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339036

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1514621)
  - Copper
  - Lead
  - Zinc
- MSD (Lab ID: 1514622)
  - Copper
  - Lead
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41595

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- SD0654-082613 (Lab ID: 10240339042)
  - Manganese

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
44 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
44 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/9159

B: Analyte was detected in the associated method blank.

- BLANK for HBN 266355 [MERP/915 (Lab ID: 1514664)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
44 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0654-082613 (Lab ID: 10240339042)
- SD0659-082613 (Lab ID: 10240339012)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
44 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/32079

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1515708)
  - Total Suspended Solids

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1515708)
  - Total Suspended Solids

QC Batch: WET/32104

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1516733)
  - Total Suspended Solids

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0654-082613 (Lab ID: 10240339042)
- SD0659-082613 (Lab ID: 10240339012)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0654-082613 (Lab ID: 10240339042)
- SD0659-082613 (Lab ID: 10240339012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
44 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16017

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339041,10241031006

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1523490)
  - Sulfate
- MSD (Lab ID: 1523491)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0654-082613 (Lab ID: 10240339042)
- SD0659-082613 (Lab ID: 10240339012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0654-082613 (Lab ID: 10240339042)
- SD0659-082613 (Lab ID: 10240339012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0639-082613 **Lab ID: 10240339001** Collected: 08/28/13 10:11 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 10:33	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 10:33	7440-43-9	
Copper	**0.16**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 10:33	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 10:33	7439-92-1	
Zinc	**0.35**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 10:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0057**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 17:57	7440-38-2	
Cadmium, Dissolved	**0.00032**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 17:57	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 17:57	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 17:57	7439-92-1	
Zinc, Dissolved	**0.039**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 17:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00024**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:00	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000046J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:24	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**141**	mg/L	10.0	5.0	1		09/03/13 11:21		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.7**	mg/L	2.5	1.2	1		09/06/13 11:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0640-082613 **Lab ID: 10240339002** Collected: 08/28/13 10:16 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 10:44	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 10:44	7440-43-9	
Copper	**0.28**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 10:44	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 10:44	7439-92-1	
Zinc	**0.62**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0050**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 18:06	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 18:06	7440-43-9	
Copper, Dissolved	**0.039**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 18:06	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 18:06	7439-92-1	
Zinc, Dissolved	**0.032**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 18:06	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00048**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:02	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000034J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:26	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**437**	mg/L	10.0	5.0	1		09/03/13 11:21		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.5**	mg/L	2.5	1.2	1		09/06/13 11:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0641-082613 **Lab ID: 10240339003** Collected: 08/28/13 10:20 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 10:47	7440-38-2	
Cadmium	**0.0042**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 10:47	7440-43-9	
Copper	**0.53**	mg/L	0.0025	0.00087	5	08/30/13 12:10	09/04/13 08:24	7440-50-8	
Lead	**0.45**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 10:47	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:24	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0059**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 18:11	7440-38-2	
Cadmium, Dissolved	**0.00023**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 18:11	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 18:11	7440-50-8	
Lead, Dissolved	**0.0031**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 18:11	7439-92-1	
Zinc, Dissolved	**0.037**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 18:11	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000043J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1040**	mg/L	100	50.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.3**	mg/L	2.5	1.2	1		09/06/13 11:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0642-082613 **Lab ID: 10240339004** Collected: 08/28/13 10:25 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 10:50	7440-38-2	
Cadmium	**0.0031**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 10:50	7440-43-9	
Copper	**0.44**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 10:50	7440-50-8	
Lead	**0.16**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 10:50	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0046**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 18:16	7440-38-2	
Cadmium, Dissolved	**0.00054**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 18:16	7440-43-9	
Copper, Dissolved	**0.12**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 18:16	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 18:16	7439-92-1	
Zinc, Dissolved	**0.23**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 18:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00084**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:17	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000043J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:41	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**281**	mg/L	25.0	12.5	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.4**	mg/L	2.5	1.2	1		09/06/13 11:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0643-082613 **Lab ID: 10240339005** Collected: 08/28/13 10:29 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 10:52	7440-38-2	
Cadmium	**0.0033**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 10:52	7440-43-9	
Copper	**0.45**	mg/L	0.0025	0.00087	5	08/30/13 12:10	09/04/13 08:30	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 10:52	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:30	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0044**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 18:20	7440-38-2	
Cadmium, Dissolved	**0.00053**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 18:20	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 18:20	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 18:20	7439-92-1	
Zinc, Dissolved	**0.23**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 18:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00081**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000042J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**838**	mg/L	50.0	25.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.4**	mg/L	2.5	1.2	1		09/06/13 11:54	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0644-082613 **Lab ID: 10240339006** Collected: 08/28/13 10:32 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:04	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:04	7440-43-9	
Copper	**0.00026J**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:04	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:04	7439-92-1	
Zinc	ND	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:04	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 18:25	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 18:25	7440-43-9	
Copper, Dissolved	**0.00021J**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 18:25	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 18:25	7439-92-1	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 18:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:22	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:46	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/06/13 11:54	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0645-082613 **Lab ID: 10240339007** Collected: 08/28/13 10:36 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:06	7440-38-2	
Cadmium	**0.0023**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:06	7440-43-9	
Copper	**0.28**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:06	7440-50-8	
Lead	**0.19**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:06	7439-92-1	
Zinc	**0.82**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0093**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 18:57	7440-38-2	
Cadmium, Dissolved	**0.00062**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 18:57	7440-43-9	
Copper, Dissolved	**0.079**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 18:57	7440-50-8	
Lead, Dissolved	**0.0023**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 18:57	7439-92-1	
Zinc, Dissolved	**0.17**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 18:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00029**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:48	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**183**	mg/L	12.5	6.2	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.3**	mg/L	2.5	1.2	1		09/06/13 11:54	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0646-082613 **Lab ID: 10240339008** Collected: 08/28/13 10:39 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:09	7440-38-2	
Cadmium	**0.0025**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:09	7440-43-9	
Copper	**0.30**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:09	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:09	7439-92-1	
Zinc	**0.95**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:36	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0073**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 19:03	7440-38-2	
Cadmium, Dissolved	**0.00051**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 19:03	7440-43-9	
Copper, Dissolved	**0.075**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 19:03	7440-50-8	
Lead, Dissolved	**0.0029**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 19:03	7439-92-1	
Zinc, Dissolved	**0.15**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 19:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00043**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:27	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000035J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**264**	mg/L	33.3	16.7	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.3**	mg/L	2.5	1.2	1		09/06/13 11:54	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0647-082613 **Lab ID: 10240339009** Collected: 08/28/13 10:42 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:12	7440-38-2	
Cadmium	**0.0027**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:12	7440-43-9	
Copper	**0.29**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:12	7440-50-8	
Lead	**0.23**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:12	7439-92-1	
Zinc	**1.0**	mg/L	0.025	0.0049	5	08/30/13 12:10	09/04/13 08:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0058**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 19:07	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 19:07	7440-43-9	
Copper, Dissolved	**0.063**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 19:07	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 19:07	7439-92-1	
Zinc, Dissolved	**0.10**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 19:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00036**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:29	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000031J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 15:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**413**	mg/L	20.0	10.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.6**	mg/L	2.5	1.2	1		09/06/13 11:57	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0657-082613 **Lab ID: 10240339010** Collected: 08/28/13 11:19 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:15	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:15	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:15	7440-50-8	
Lead	**0.085**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:15	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 19:13	7440-38-2	
Cadmium, Dissolved	**0.00063**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 19:13	7440-43-9	
Copper, Dissolved	**0.10**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 19:13	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 19:13	7439-92-1	
Zinc, Dissolved	**0.054**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 19:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00017J**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:37	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:01	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**101**	mg/L	12.5	6.2	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**28.8**	mg/L	5.0	2.5	2		09/06/13 12:08	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0658-082613 **Lab ID: 10240339011** Collected: 08/28/13 11:22 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:17	7440-38-2	
Cadmium	**0.00096**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:17	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:17	7440-50-8	
Lead	**0.073**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:17	7439-92-1	
Zinc	**0.25**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:17	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 19:18	7440-38-2	
Cadmium, Dissolved	**0.00052**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 19:18	7440-43-9	
Copper, Dissolved	**0.091**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 19:18	7440-50-8	
Lead, Dissolved	**0.0029**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 19:18	7439-92-1	
Zinc, Dissolved	**0.059**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 19:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00021**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:39	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000043J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**85.8**	mg/L	12.5	6.2	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.9**	mg/L	2.5	1.2	1		09/06/13 11:59	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0659-082613 **Lab ID: 10240339012** Collected: 08/28/13 11:25 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:23	7440-38-2	
Cadmium	**0.00088**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:23	7440-43-9	
Calcium	**21.5**	mg/L	0.020	0.0098	1	08/30/13 12:10	09/03/13 11:23	7440-70-2	
Copper	**0.15**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:23	7440-50-8	
Iron	**2.3**	mg/L	0.050	0.0059	1	08/30/13 12:10	09/03/13 11:23	7439-89-6	
Lead	**0.054**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:23	7439-92-1	
Magnesium	**6.3**	mg/L	0.0050	0.0024	1	08/30/13 12:10	09/03/13 11:23	7439-95-4	
Manganese	**0.16**	mg/L	0.00050	0.00018	1	08/30/13 12:10	09/03/13 11:23	7439-96-5	
Potassium	**7.4**	mg/L	0.020	0.0047	1	08/30/13 12:10	09/03/13 11:23	7440-09-7	
Sodium	**4.7**	mg/L	0.050	0.010	1	08/30/13 12:10	09/03/13 11:23	7440-23-5	
Zinc	**0.27**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:23	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 19:24	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 19:24	7440-43-9	
Copper, Dissolved	**0.00020J**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 19:24	7440-50-8	
Lead, Dissolved	**0.00024**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 19:24	7439-92-1	
Silica, Dissolved	ND	ug/L	53.5	26.8	1	09/05/13 08:26	09/11/13 19:24	7631-86-9	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 19:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00027**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:42	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000048J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:06	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**42.6**	mg/L	5.0	2.5	1		01/03/14 12:47		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**77.7**	mg/L	10.0	5.0	1		09/04/13 11:18		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.4**	Std. Units	0.10	0.050	1		01/03/14 09:57		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.3**	mg/L	0.10	0.050	1		01/03/14 12:18	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.3**	mg/L	0.10	0.050	1		01/03/14 12:18		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.2**	mg/L	2.5	1.2	1		09/06/13 11:59	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**17.3**	mg/L	2.0	1.0	1		01/02/14 14:18	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0659-082613 **Lab ID: 10240339012** Collected: 08/28/13 11:25 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0660-082613 **Lab ID: 10240339013** Collected: 08/28/13 11:31 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:26	7440-38-2	
Cadmium	**0.00067**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:26	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:26	7440-50-8	
Lead	**0.030**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:26	7439-92-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.016**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/12/13 10:52	7440-38-2	
Cadmium, Dissolved	**0.00049**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/12/13 10:52	7440-43-9	
Copper, Dissolved	**0.088**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/12/13 10:52	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/12/13 10:52	7439-92-1	
Zinc, Dissolved	**0.043**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/12/13 10:52	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000072J**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000034J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:08	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**48.3**	mg/L	10.0	5.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**39.6**	mg/L	5.0	2.5	2		09/06/13 12:12	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0661-082613 **Lab ID: 10240339014** Collected: 08/28/13 11:34 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:28	7440-38-2	
Cadmium	**0.00077**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:28	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:28	7440-50-8	
Lead	**0.030**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:28	7439-92-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:28	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.015**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/12/13 10:57	7440-38-2	
Cadmium, Dissolved	**0.00055**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/12/13 10:57	7440-43-9	
Copper, Dissolved	**0.10**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/12/13 10:57	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/12/13 10:57	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/12/13 10:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000075J**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000034J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:10	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**61.7**	mg/L	10.0	5.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**33.6**	mg/L	5.0	2.5	2		09/06/13 12:12	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0662-082613 **Lab ID: 10240339015** Collected: 08/28/13 11:38 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/06/13 09:38	09/10/13 02:42	7440-50-8	M1
Zinc	**0.18**	mg/L	0.0050	0.00098	1	09/06/13 09:38	09/10/13 02:42	7440-66-6	
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/06/13 09:38	09/10/13 02:42	7440-38-2	
Cadmium	**0.00083**	mg/L	0.000080	0.000032	1	09/06/13 09:38	09/10/13 02:42	7440-43-9	
Lead	**0.045**	mg/L	0.00010	0.000046	1	09/06/13 09:38	09/10/13 02:42	7439-92-1	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Copper, Dissolved	**0.088**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 19:42	7440-50-8	
Zinc, Dissolved	**0.038**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 19:42	7440-66-6	
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 19:42	7440-38-2	
Cadmium, Dissolved	**0.00046**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 19:42	7440-43-9	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 19:42	7439-92-1	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00011J**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:49	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**101**	mg/L	10.0	5.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.4**	mg/L	5.0	2.5	2		09/06/13 12:15	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0663-082613 **Lab ID: 10240339016** Collected: 08/28/13 11:42 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.030**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:40	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:40	7440-43-9	
Copper	**0.39**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:40	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:40	7439-92-1	
Zinc	**0.35**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:40	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 20:09	7440-38-2	
Cadmium, Dissolved	**0.00044**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 20:09	7440-43-9	
Copper, Dissolved	**0.083**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 20:09	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 20:09	7439-92-1	
Zinc, Dissolved	**0.041**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 20:09	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020J**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:52	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000032J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**193**	mg/L	10.0	5.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**33.6**	mg/L	5.0	2.5	2		09/06/13 12:15	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0664-082613 **Lab ID: 10240339017** Collected: 08/28/13 11:45 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.031**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:43	7440-38-2	
Cadmium	**0.0025**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:43	7440-43-9	
Copper	**0.42**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:43	7440-50-8	
Lead	**0.15**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:43	7439-92-1	
Zinc	**0.58**	mg/L	0.010	0.0020	2	08/30/13 12:10	09/04/13 08:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 20:13	7440-38-2	
Cadmium, Dissolved	**0.00061**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 20:13	7440-43-9	
Copper, Dissolved	**0.069**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 20:13	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 20:13	7439-92-1	
Zinc, Dissolved	**0.050**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 20:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00044**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 14:59	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:23	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**307**	mg/L	20.0	10.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**33.7**	mg/L	5.0	2.5	2		09/06/13 12:15	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0665-082613 **Lab ID: 10240339018** Collected: 08/28/13 11:48 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:45	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:45	7440-43-9	
Copper	**0.27**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:45	7440-50-8	
Lead	**0.16**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:45	7439-92-1	
Zinc	**0.53**	mg/L	0.010	0.0020	2	08/30/13 12:10	09/04/13 08:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0087**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 20:18	7440-38-2	
Cadmium, Dissolved	**0.00059**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 20:18	7440-43-9	
Copper, Dissolved	**0.059**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 20:18	7440-50-8	
Lead, Dissolved	**0.0030**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 20:18	7439-92-1	
Zinc, Dissolved	**0.061**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 20:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00040**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 15:02	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000040J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:25	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**188**	mg/L	16.7	8.3	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.8**	mg/L	2.5	1.2	1		09/06/13 12:02	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0666-082613 **Lab ID: 10240339019** Collected: 08/28/13 11:52 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:48	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:48	7440-43-9	
Copper	**0.28**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:48	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:48	7439-92-1	
Zinc	**0.43**	mg/L	0.0050	0.00098	1	08/30/13 12:10	09/03/13 11:48	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0059**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 20:23	7440-38-2	
Cadmium, Dissolved	**0.00040**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 20:23	7440-43-9	
Copper, Dissolved	**0.056**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 20:23	7440-50-8	
Lead, Dissolved	**0.0032**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 20:23	7439-92-1	
Zinc, Dissolved	**0.061**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 20:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00055**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 15:04	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000048J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**251**	mg/L	20.0	10.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.2**	mg/L	2.5	1.2	1		09/06/13 12:04	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0667-082613 **Lab ID: 10240339020** Collected: 08/28/13 11:56 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	08/30/13 12:10	09/03/13 11:51	7440-38-2	
Cadmium	**0.0024**	mg/L	0.000080	0.000032	1	08/30/13 12:10	09/03/13 11:51	7440-43-9	
Copper	**0.42**	mg/L	0.00050	0.00017	1	08/30/13 12:10	09/03/13 11:51	7440-50-8	
Lead	**0.24**	mg/L	0.00010	0.000046	1	08/30/13 12:10	09/03/13 11:51	7439-92-1	
Zinc	**0.84**	mg/L	0.010	0.0020	2	08/30/13 12:10	09/04/13 08:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0065**	mg/L	0.00050	0.000093	1	09/05/13 08:26	09/11/13 20:28	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	09/05/13 08:26	09/11/13 20:28	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/05/13 08:26	09/11/13 20:28	7440-50-8	
Lead, Dissolved	**0.0042**	mg/L	0.00010	0.000046	1	09/05/13 08:26	09/11/13 20:28	7439-92-1	
Zinc, Dissolved	**0.077**	mg/L	0.0050	0.00098	1	09/05/13 08:26	09/11/13 20:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	09/06/13 15:41	09/10/13 15:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000051J**	mg/L	0.00020	0.000030	1	09/07/13 07:38	09/10/13 16:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**251**	mg/L	20.0	10.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.8**	mg/L	2.5	1.2	1		09/06/13 12:04	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0668-082613 **Lab ID: 10240339021** Collected: 08/28/13 11:59 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:16	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:16	7440-43-9	
Copper	**0.44**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:16	7440-50-8	M1
Lead	**0.21**	mg/L	0.00050	0.00023	5	09/07/13 08:02	09/10/13 17:18	7439-92-1	M1
Zinc	**0.78**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/10/13 17:18	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0064**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 12:45	7440-38-2	
Cadmium, Dissolved	**0.00033**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 12:45	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 12:45	7440-50-8	
Lead, Dissolved	**0.0037**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 12:45	7439-92-1	
Zinc, Dissolved	**0.074**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 12:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0017**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 10:41	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 11:48	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**396**	mg/L	20.0	10.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		09/06/13 12:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0669-082613 **Lab ID: 10240339022** Collected: 08/28/13 12:03 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:27	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:27	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:27	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 17:27	7439-92-1	
Zinc	ND	mg/L	0.0050	0.00098	1	09/07/13 08:02	09/10/13 17:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 12:56	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 12:56	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 12:56	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 12:56	7439-92-1	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 12:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 10:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 11:50	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/04/13 11:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/06/13 12:29	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0670-082613 **Lab ID: 10240339023** Collected: 08/28/13 12:07 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.023**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:30	7440-38-2	
Cadmium	**0.00079**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:30	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:30	7440-50-8	
Lead	**0.029**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 17:30	7439-92-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	09/07/13 08:02	09/10/13 17:30	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.015**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 12:59	7440-38-2	
Cadmium, Dissolved	**0.00043**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 12:59	7440-43-9	
Copper, Dissolved	**0.078**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 12:59	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 12:59	7439-92-1	
Zinc, Dissolved	**0.038**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 12:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000041J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 10:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:04	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**49.0**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**44.0**	mg/L	5.0	2.5	2		09/06/13 12:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0671-082613 **Lab ID: 10240339024** Collected: 08/28/13 12:10 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:32	7440-38-2	
Cadmium	**0.00078**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:32	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:32	7440-50-8	
Lead	**0.041**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 17:32	7439-92-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	09/07/13 08:02	09/10/13 17:32	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:02	7440-38-2	
Cadmium, Dissolved	**0.00040**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:02	7440-43-9	
Copper, Dissolved	**0.082**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:02	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:02	7439-92-1	
Zinc, Dissolved	**0.040**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000052J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 10:59	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**70.8**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**35.0**	mg/L	5.0	2.5	2		09/06/13 12:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0672-082613 **Lab ID: 10240339025** Collected: 08/28/13 12:13 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:35	7440-38-2	
Cadmium	**0.00084**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:35	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:35	7440-50-8	
Lead	**0.042**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 17:35	7439-92-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	09/07/13 08:02	09/11/13 16:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:05	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:05	7440-43-9	
Copper, Dissolved	**0.086**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:05	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:05	7439-92-1	
Zinc, Dissolved	**0.040**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000069J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:01	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:09	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**113**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**28.3**	mg/L	5.0	2.5	2		09/06/13 12:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0673-082613 **Lab ID: 10240339026** Collected: 08/28/13 12:16 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.031**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:46	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:46	7440-43-9	
Copper	**0.43**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:46	7440-50-8	
Lead	**0.094**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 17:46	7439-92-1	
Zinc	**0.37**	mg/L	0.0050	0.00098	1	09/07/13 08:02	09/11/13 16:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:16	7440-38-2	
Cadmium, Dissolved	**0.00044**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:16	7440-43-9	
Copper, Dissolved	**0.096**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:16	7440-50-8	
Lead, Dissolved	**0.0065**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:16	7439-92-1	
Zinc, Dissolved	**0.055**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:04	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:12	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**177**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**32.4**	mg/L	5.0	2.5	2		09/06/13 12:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0674-082613 **Lab ID: 10240339027** Collected: 08/28/13 12:20 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.054**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:49	7440-38-2	
Cadmium	**0.0040**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:49	7440-43-9	
Copper	**0.64**	mg/L	0.0025	0.00087	5	09/07/13 08:02	09/11/13 16:14	7440-50-8	
Lead	**0.26**	mg/L	0.00050	0.00023	5	09/07/13 08:02	09/11/13 16:14	7439-92-1	
Zinc	**0.92**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/11/13 16:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:19	7440-38-2	
Cadmium, Dissolved	**0.00064**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:19	7440-43-9	
Copper, Dissolved	**0.063**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:19	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:19	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00050**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:14	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**200**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**38.9**	mg/L	5.0	2.5	2		09/06/13 12:48	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0675-082613 **Lab ID: 10240339028** Collected: 08/28/13 12:27 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.030**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 17:55	7440-38-2	
Cadmium	**0.0040**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 17:55	7440-43-9	
Copper	**0.44**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 17:55	7440-50-8	
Lead	**0.24**	mg/L	0.00050	0.00023	5	09/07/13 08:02	09/11/13 16:17	7439-92-1	
Zinc	**0.84**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/11/13 16:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0098**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:22	7440-38-2	
Cadmium, Dissolved	**0.00070**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:22	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:22	7440-50-8	
Lead, Dissolved	**0.0036**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:22	7439-92-1	
Zinc, Dissolved	**0.066**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00046**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:08	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:17	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**273**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.2**	mg/L	2.5	1.2	1		09/06/13 12:31	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0676-082613 **Lab ID: 10240339029** Collected: 08/28/13 12:31 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 18:00	7440-38-2	
Cadmium	**0.0021**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 18:00	7440-43-9	
Copper	**0.33**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 18:00	7440-50-8	
Lead	**0.17**	mg/L	0.00050	0.00023	5	09/07/13 08:02	09/10/13 18:03	7439-92-1	
Zinc	**0.65**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/10/13 18:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0049**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:25	7440-38-2	
Cadmium, Dissolved	**0.00048**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:25	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:25	7440-50-8	
Lead, Dissolved	**0.0046**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:25	7439-92-1	
Zinc, Dissolved	**0.079**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00076**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:11	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:19	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**391**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		09/06/13 12:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0677-082613 **Lab ID: 10240339030** Collected: 08/28/13 12:34 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 18:06	7440-38-2	
Cadmium	**0.0025**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 18:06	7440-43-9	
Copper	**0.37**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/10/13 18:06	7440-50-8	
Lead	**0.082**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 18:06	7439-92-1	
Zinc	**0.70**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/10/13 18:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0034**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:28	7440-38-2	
Cadmium, Dissolved	**0.00061**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:28	7440-43-9	
Copper, Dissolved	**0.088**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:28	7440-50-8	
Lead, Dissolved	**0.0010**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:28	7439-92-1	
Zinc, Dissolved	**0.23**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000094J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:26	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**349**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.3**	mg/L	2.5	1.2	1		09/06/13 12:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0678-082613 **Lab ID: 10240339031** Collected: 08/28/13 12:39 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/11/13 16:20	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/11/13 16:20	7440-43-9	
Copper	**0.41**	mg/L	0.00050	0.00017	1	09/07/13 08:02	09/11/13 16:20	7440-50-8	
Lead	**0.072**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/11/13 16:20	7439-92-1	
Zinc	**0.30**	mg/L	0.0050	0.00098	1	09/07/13 08:02	09/11/13 16:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0098**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:39	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:39	7440-43-9	
Copper, Dissolved	**0.10**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:39	7440-50-8	
Lead, Dissolved	**0.00095**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:39	7439-92-1	
Zinc, Dissolved	**0.020**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000073J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:21	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:29	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**223**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.2**	mg/L	2.5	1.2	1		09/06/13 12:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0679-082613 **Lab ID: 10240339032** Collected: 08/28/13 12:42 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.027**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 18:22	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 18:22	7440-43-9	
Copper	**0.58**	mg/L	0.0025	0.00087	5	09/07/13 08:02	09/13/13 12:16	7440-50-8	
Lead	**0.086**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 18:22	7439-92-1	
Zinc	**0.64**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/13/13 12:16	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0067**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:42	7440-38-2	
Cadmium, Dissolved	**0.00015**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:42	7440-43-9	
Copper, Dissolved	**0.077**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:42	7440-50-8	
Lead, Dissolved	**0.00077**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:42	7439-92-1	
Zinc, Dissolved	**0.015**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:31	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**510**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.5**	mg/L	2.5	1.2	1		09/06/13 12:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0680-082613 **Lab ID: 10240339033** Collected: 08/28/13 12:45 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.030**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 18:33	7440-38-2	
Cadmium	**0.0023**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 18:33	7440-43-9	
Copper	**0.76**	mg/L	0.0025	0.00087	5	09/07/13 08:02	09/10/13 18:36	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	09/07/13 08:02	09/10/13 18:33	7439-92-1	
Zinc	**0.58**	mg/L	0.025	0.0049	5	09/07/13 08:02	09/10/13 18:36	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0084**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:48	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:48	7440-43-9	
Copper, Dissolved	**0.082**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:48	7440-50-8	
Lead, Dissolved	**0.00094**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:48	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00016J**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**825**	mg/L	10.0	5.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.6**	mg/L	2.5	1.2	1		09/06/13 12:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0681-082613 **Lab ID: 10240339034** Collected: 08/28/13 12:48 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.51**	mg/L	0.0025	0.00046	5	09/07/13 08:02	09/10/13 18:41	7440-38-2	
Cadmium	**0.019**	mg/L	0.00040	0.00016	5	09/07/13 08:02	09/10/13 18:41	7440-43-9	
Copper	**4.7**	mg/L	0.025	0.0087	50	09/07/13 08:02	09/11/13 16:28	7440-50-8	
Lead	**1.3**	mg/L	0.0010	0.00046	10	09/07/13 08:02	09/11/13 16:25	7439-92-1	
Zinc	**4.0**	mg/L	0.050	0.0098	10	09/07/13 08:02	09/11/13 16:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.021**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:50	7440-38-2	
Cadmium, Dissolved	**0.0022**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:50	7440-43-9	
Copper, Dissolved	**0.35**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:50	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:50	7439-92-1	
Zinc, Dissolved	**0.24**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0026**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:36	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1990**	mg/L	50.0	25.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**84.9**	mg/L	12.5	6.2	5		09/06/13 13:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0682-082613 **Lab ID: 10240339035** Collected: 08/28/13 12:52 Received: 08/29/13 09:14 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.30**	mg/L	0.00050	0.000093	1	09/07/13 08:02	09/10/13 18:28	7440-38-2	
Cadmium	**0.038**	mg/L	0.000080	0.000032	1	09/07/13 08:02	09/10/13 18:28	7440-43-9	
Copper	**4.6**	mg/L	0.025	0.0087	50	09/07/13 08:02	09/10/13 18:30	7440-50-8	
Lead	**2.3**	mg/L	0.0050	0.0023	50	09/07/13 08:02	09/10/13 18:30	7439-92-1	
Zinc	**8.0**	mg/L	0.25	0.049	50	09/07/13 08:02	09/10/13 18:30	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.021**	mg/L	0.00050	0.000093	1	09/07/13 08:12	09/10/13 13:53	7440-38-2	
Cadmium, Dissolved	**0.00047**	mg/L	0.000080	0.000032	1	09/07/13 08:12	09/10/13 13:53	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	09/07/13 08:12	09/10/13 13:53	7440-50-8	
Lead, Dissolved	**0.0056**	mg/L	0.00010	0.000046	1	09/07/13 08:12	09/10/13 13:53	7439-92-1	
Zinc, Dissolved	**0.061**	mg/L	0.0050	0.00098	1	09/07/13 08:12	09/10/13 13:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0010**	mg/L	0.00020	0.000030	1	09/07/13 07:44	09/11/13 11:31	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/07/13 07:41	09/11/13 12:39	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2070**	mg/L	20.0	10.0	1		09/04/13 17:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**32.9**	mg/L	5.0	2.5	2		09/06/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0648-082613 **Lab ID: 10240339036** Collected: 08/28/13 10:45 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.056**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 09:55	7440-38-2	
Cadmium	**0.0054**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 09:55	7440-43-9	
Copper	**0.66**	mg/L	0.0025	0.00087	5	09/08/13 06:40	09/10/13 09:57	7440-50-8	M1
Lead	**0.72**	mg/L	0.00050	0.00023	5	09/08/13 06:40	09/10/13 09:57	7439-92-1	M1
Zinc	**2.1**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 09:57	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0072**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 08:53	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 08:53	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 08:53	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 08:53	7439-92-1	
Zinc, Dissolved	**0.034**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 08:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00072**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:09	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 14:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1110**	mg/L	20.0	10.0	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.8**	mg/L	2.5	1.2	1		09/06/13 12:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0649-082613 **Lab ID: 10240339037** Collected: 08/28/13 10:49 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 10:05	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 10:05	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 10:05	7440-50-8	
Lead	**0.15**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 10:05	7439-92-1	
Zinc	**0.53**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 10:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0092**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:04	7440-38-2	
Cadmium, Dissolved	**0.00037**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:04	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:04	7440-50-8	
Lead, Dissolved	**0.0027**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:04	7439-92-1	
Zinc, Dissolved	**0.064**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00021**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:11	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00011J**	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 14:55	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**141**	mg/L	10.0	5.0	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.6**	mg/L	2.5	1.2	1		09/06/13 12:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0650-082613 **Lab ID: 10240339038** Collected: 08/28/13 10:52 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 10:11	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 10:11	7440-43-9	
Copper	**0.16**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 10:11	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 10:11	7439-92-1	
Zinc	**0.58**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 10:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0089**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:07	7440-38-2	
Cadmium, Dissolved	**0.00037**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:07	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:07	7440-50-8	
Lead, Dissolved	**0.0070**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:07	7439-92-1	
Zinc, Dissolved	**0.075**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00025**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:23	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 15:08	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**193**	mg/L	10.0	5.0	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.6**	mg/L	2.5	1.2	1		09/06/13 12:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0651-082613 **Lab ID: 10240339039** Collected: 08/28/13 10:56 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 11:21	7440-38-2	
Cadmium	**0.0020**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 11:21	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 11:21	7440-50-8	
Lead	**0.20**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 11:21	7439-92-1	
Zinc	**0.71**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 11:23	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0090**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:10	7440-38-2	
Cadmium, Dissolved	**0.00032**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:10	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:10	7440-50-8	
Lead, Dissolved	**0.0061**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:10	7439-92-1	
Zinc, Dissolved	**0.076**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00030**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:26	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 15:10	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**219**	mg/L	14.3	7.1	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.2**	mg/L	2.5	1.2	1		09/06/13 12:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0652-082613 **Lab ID: 10240339040** Collected: 08/28/13 10:59 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 11:26	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 11:26	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 11:26	7440-50-8	
Lead	**0.16**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 11:26	7439-92-1	
Zinc	**1.2**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 11:29	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0078**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:21	7440-38-2	
Cadmium, Dissolved	**0.00032**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:21	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:21	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:21	7439-92-1	
Zinc, Dissolved	**0.050**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00039**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:28	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 15:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**471**	mg/L	20.0	10.0	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.6**	mg/L	2.5	1.2	1		09/06/13 12:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0653-082613 **Lab ID: 10240339041** Collected: 08/28/13 11:03 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 11:32	7440-38-2	
Cadmium	**0.0035**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 11:32	7440-43-9	
Copper	**0.31**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 11:32	7440-50-8	
Lead	**0.33**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 11:32	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 11:34	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0060**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:24	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:24	7440-43-9	
Copper, Dissolved	**0.039**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:24	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:24	7439-92-1	
Zinc, Dissolved	**0.043**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00048**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:31	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 15:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**807**	mg/L	20.0	10.0	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.8**	mg/L	2.5	1.2	1		09/13/13 09:13	14808-79-8	B

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0654-082613 **Lab ID: 10240339042** Collected: 08/28/13 11:07 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.044**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 11:37	7440-38-2	
Cadmium	**0.0042**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 11:37	7440-43-9	
Calcium	**46.2**	mg/L	0.10	0.049	5	09/08/13 06:40	09/10/13 11:40	7440-70-2	
Copper	**0.45**	mg/L	0.0025	0.00087	5	09/08/13 06:40	09/10/13 11:40	7440-50-8	
Iron	**26.9**	mg/L	0.25	0.030	5	09/08/13 06:40	09/10/13 11:40	7439-89-6	
Lead	**0.47**	mg/L	0.00050	0.00023	5	09/08/13 06:40	09/10/13 11:40	7439-92-1	
Magnesium	**13.2**	mg/L	0.025	0.012	5	09/08/13 06:40	09/10/13 11:40	7439-95-4	
Manganese	**2.3**	mg/L	0.0025	0.00092	5	09/08/13 06:40	09/10/13 11:40	7439-96-5	E
Potassium	**8.6**	mg/L	0.10	0.024	5	09/08/13 06:40	09/10/13 11:40	7440-09-7	
Silica	**112**	mg/L	0.27	0.13	5	09/08/13 06:40	09/10/13 11:40	7631-86-9	
Sodium	**5.4**	mg/L	0.25	0.051	5	09/08/13 06:40	09/10/13 11:40	7440-23-5	
Zinc	**1.9**	mg/L	0.025	0.0049	5	09/08/13 06:40	09/10/13 11:40	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0053**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:26	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:26	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:26	7440-50-8	
Lead, Dissolved	**0.0029**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:26	7439-92-1	
Zinc, Dissolved	**0.063**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00073**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 15:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**76.5**	mg/L	5.0	2.5	1		01/03/14 12:58		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1370**	mg/L	20.0	10.0	1		09/04/13 17:19		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.5**	Std. Units	0.10	0.050	1		01/03/14 09:56		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**0.98**	mg/L	0.10	0.050	1		01/03/14 12:19	14797-55-8	H1
Nitrogen, NO2 plus NO3	**0.98**	mg/L	0.10	0.050	1		01/03/14 12:19		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.8**	mg/L	2.5	1.2	1		09/13/13 09:16	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**6.9**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0654-082613 **Lab ID: 10240339042** Collected: 08/28/13 11:07 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:48	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0655-082613 **Lab ID: 10240339043** Collected: 08/28/13 11:12 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 11:43	7440-38-2	
Cadmium	**0.00089**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 11:43	7440-43-9	
Copper	**0.22**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 11:43	7440-50-8	
Lead	**0.040**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 11:43	7439-92-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	09/08/13 06:40	09/10/13 11:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:29	7440-38-2	
Cadmium, Dissolved	**0.00050**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:29	7440-43-9	
Copper, Dissolved	**0.097**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:29	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:29	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00018J**	mg/L	0.00020	0.000030	1	09/08/13 08:58	09/09/13 14:36	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/08/13 09:00	09/09/13 15:20	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**76.6**	mg/L	10.0	5.0	1		09/04/13 17:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**31.6**	mg/L	5.0	2.5	2		09/13/13 09:32	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Sample: SD0656-082613 **Lab ID: 10240339044** Collected: 08/28/13 11:16 Received: 08/30/13 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.023**	mg/L	0.00050	0.000093	1	09/08/13 06:40	09/10/13 11:57	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/08/13 06:40	09/10/13 11:57	7440-43-9	
Copper	**0.25**	mg/L	0.00050	0.00017	1	09/08/13 06:40	09/10/13 11:57	7440-50-8	
Lead	**0.065**	mg/L	0.00010	0.000046	1	09/08/13 06:40	09/10/13 11:57	7439-92-1	
Zinc	**0.23**	mg/L	0.0050	0.00098	1	09/08/13 06:40	09/10/13 11:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/08/13 06:35	09/10/13 09:32	7440-38-2	
Cadmium, Dissolved	**0.00053**	mg/L	0.000080	0.000032	1	09/08/13 06:35	09/10/13 09:32	7440-43-9	
Copper, Dissolved	**0.10**	mg/L	0.00050	0.00017	1	09/08/13 06:35	09/10/13 09:32	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/08/13 06:35	09/10/13 09:32	7439-92-1	
Zinc, Dissolved	**0.051**	mg/L	0.0050	0.00098	1	09/08/13 06:35	09/10/13 09:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**100**	mg/L	10.0	5.0	1		09/04/13 17:20		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**32.7**	mg/L	5.0	2.5	2		09/13/13 09:32	14808-79-8	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9149 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

METHOD BLANK: 1514008 — Matrix: Water
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/10/13 13:55	

LABORATORY CONTROL SAMPLE: 1514009

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0053	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514010 — 1514011

Parameter	Units	10240339002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00048	.005	.005	0.0053	0.0054	96	99	85-115	3	20	

MATRIX SPIKE SAMPLE: 1514012

Parameter	Units	10240339020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0014	.005	0.0065	103	85-115	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9152 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

METHOD BLANK: 1514023 — Matrix: Water
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/11/13 10:37	

LABORATORY CONTROL SAMPLE: 1514024

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514025 1514026

Parameter	Units	10240339022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0047	0.0047	95	94	85-115	.4	20	

MATRIX SPIKE SAMPLE: 1514027

Parameter	Units	10240339035 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0010	.005	0.0055	90	85-115	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9159 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043

METHOD BLANK: 1514664 Matrix: Water
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000062J	0.00020	09/09/13 14:04	

LABORATORY CONTROL SAMPLE: 1514665

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514666 1514667

Parameter	Units	10240339037 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00021	.005	.005	0.0051	0.0050	97	97	85-115	.4	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9178 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240339044

METHOD BLANK: 1516858 | Matrix: Water
Associated Lab Samples: 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/11/13 12:51	

LABORATORY CONTROL SAMPLE: 1516859

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0045	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1516860 1516861

Parameter	Units	10240702021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000083J	.005	.005	0.0048	0.0049	95	97	85-115	2	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9150 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

METHOD BLANK: 1514013 — Matrix: Water
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/10/13 15:19	

LABORATORY CONTROL SAMPLE: 1514014

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514015 — 1514016

Parameter	Units	10240339002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	0.000034J	.005	.005	0.0052	0.0051	103	102	85-115	.6	20	

MATRIX SPIKE SAMPLE: 1514017

Parameter	Units	10240339020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	0.000051J	.005	0.0052	102	85-115	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9151 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

METHOD BLANK: 1514018 — Matrix: Water
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/11/13 11:43	

LABORATORY CONTROL SAMPLE: 1514019

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0054	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514020 1514021

Parameter	Units	10240339022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0050	0.0049	100	99	85-115	1	20	

MATRIX SPIKE SAMPLE: 1514022

Parameter	Units	10240339035 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0049	98	85-115	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9157 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043

METHOD BLANK: 1514634 — Matrix: Water
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/09/13 14:48	

LABORATORY CONTROL SAMPLE: 1514635

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514636 1514637

Parameter	Units	10240339037 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	0.00011 J	.005	.005	0.0050	0.0052	99	102	85-115	3	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MERP/9177 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10240339044

METHOD BLANK: 1516853 | Matrix: Water
Associated Lab Samples: 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	0.000085J	0.00020	09/11/13 13:38	

LABORATORY CONTROL SAMPLE: 1516854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1516855 1516856

Parameter	Units	10240702021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0052	0.0052	103	104	85-115	.4	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41576 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

METHOD BLANK: 1513984 — Matrix: Water
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/03/13 10:28	
Cadmium	mg/L	ND	0.000080	09/03/13 10:28	
Calcium	ug/L	11.0J	20.0	09/03/13 10:28	
Copper	mg/L	ND	0.00050	09/03/13 10:28	
Iron	ug/L	ND	50.0	09/03/13 10:28	
Lead	mg/L	ND	0.00010	09/03/13 10:28	
Magnesium	ug/L	ND	5.0	09/03/13 10:28	
Manganese	ug/L	ND	0.50	09/03/13 10:28	
Potassium	ug/L	5.3J	20.0	09/03/13 10:28	
Sodium	ug/L	ND	50.0	09/03/13 10:28	
Zinc	mg/L	ND	0.0050	09/03/13 10:28	

LABORATORY CONTROL SAMPLE: 1513985

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.077	96	85-115	
Cadmium	mg/L	.08	0.079	99	85-115	
Calcium	ug/L	1000	974	97	85-115	
Copper	mg/L	.08	0.081	101	85-115	
Iron	ug/L	1000	1040	104	85-115	
Lead	mg/L	.08	0.082	102	85-115	
Magnesium	ug/L	1000	1010	101	85-115	
Manganese	ug/L	80	78.7	98	85-115	
Potassium	ug/L	1000	957	96	85-115	
Sodium	ug/L	1000	993	99	85-115	
Zinc	mg/L	.08	0.081	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1513986 — 1513987

Parameter	Units	10240339001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.014	.08	.08	0.090	0.090	95	95	70-130	.1	20	
Cadmium	mg/L	0.0010	.08	.08	0.078	0.078	97	96	70-130	.5	20	
Calcium	ug/L	21200	1000	1000	22100	22300	93	108	70-130	.7	20	
Copper	mg/L	0.16	.08	.08	0.24	0.24	104	106	70-130	.7	20	
Iron	ug/L	4910	1000	1000	6680	6760	177	185	70-130	1	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1513986 1513987

Parameter	Units	10240339001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.10	.08	.08	0.19	0.19	107	107	70-130	.1	20	
Magnesium	ug/L	5980	1000	1000	7170	7220	120	124	70-130	.6	20	
Manganese	ug/L	276	80	80	361	362	106	107	70-130	.2	20	
Potassium	ug/L	4060	1000	1000	4930	4980	87	92	70-130	.9	20	
Sodium	ug/L	5240	1000	1000	6380	6500	114	126	70-130	2	20	
Zinc	mg/L	0.35	.08	.08	0.44	0.45	110	117	70-130	1	20	

MATRIX SPIKE SAMPLE: 1513988

Parameter	Units	10240339011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.017	.08	0.10	104	70-130	
Cadmium	mg/L	0.00096	.08	0.081	100	70-130	
Calcium	ug/L	26000	1000	29700	371	70-130	
Copper	mg/L	0.17	.08	0.27	123	70-130	
Iron	ug/L	2870	1000	4420	155	70-130	
Lead	mg/L	0.073	.08	0.17	116	70-130	
Magnesium	ug/L	7960	1000	10100	217	70-130	
Manganese	ug/L	187	80	288	126	70-130	
Potassium	ug/L	7040	1000	9150	211	70-130	
Sodium	ug/L	5670	1000	7340	167	70-130	
Zinc	mg/L	0.25	.08	0.35	135	70-130	M1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41577 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

METHOD BLANK: 1513989 — Matrix: Water
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/10/13 17:10	
Cadmium	mg/L	ND	0.000080	09/10/13 17:10	
Copper	mg/L	ND	0.00050	09/10/13 17:10	
Lead	mg/L	ND	0.00010	09/10/13 17:10	
Zinc	mg/L	ND	0.0050	09/10/13 17:10	

LABORATORY CONTROL SAMPLE: 1513990

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Lead	mg/L	.08	0.076	95	85-115	
Zinc	mg/L	.08	0.075	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1513991 1513992

Parameter	Units	10240339021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.025	.08	.08	0.11	0.11	102	110	70-130	6	20	
Cadmium	mg/L	0.0026	.08	.08	0.086	0.090	104	109	70-130	4	20	
Copper	mg/L	0.44	.08	.08	0.55	0.59	134	190	70-130	8	20	M1
Lead	mg/L	0.21	.08	.08	0.31	0.33	129	160	70-130	8	20	M1
Zinc	mg/L	0.78	.08	.08	0.84	0.91	76	163	70-130	8	20	M1

MATRIX SPIKE SAMPLE: 1519251

Parameter	Units	10240339032 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.027	.08	0.11	99	70-130	
Cadmium	mg/L	0.0014	.08	0.085	105	70-130	
Copper	mg/L	0.58	.08	0.67	113	70-130	
Lead	mg/L	0.086	.08	0.16	97	70-130	
Zinc	mg/L	0.64	.08	0.44	-248	70-130	M1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41595 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

METHOD BLANK: 1514619 — Matrix: Water
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/10/13 09:49	
Cadmium	mg/L	ND	0.000080	09/10/13 09:49	
Calcium	ug/L	ND	20.0	09/10/13 09:49	ES
Copper	mg/L	ND	0.00050	09/10/13 09:49	
Iron	ug/L	ND	50.0	09/10/13 09:49	
Lead	mg/L	ND	0.00010	09/10/13 09:49	
Magnesium	ug/L	4.0J	5.0	09/10/13 09:49	
Manganese	ug/L	ND	0.50	09/10/13 09:49	ES
Potassium	ug/L	ND	20.0	09/10/13 09:49	ES
Sodium	ug/L	ND	50.0	09/10/13 09:49	
Zinc	mg/L	ND	0.0050	09/10/13 09:49	

LABORATORY CONTROL SAMPLE: 1514620

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.081	102	85-115	
Cadmium	mg/L	.08	0.085	107	85-115	
Calcium	ug/L	1000	1020	102	85-115	ES
Copper	mg/L	.08	0.085	106	85-115	
Iron	ug/L	1000	1080	108	85-115	
Lead	mg/L	.08	0.086	107	85-115	
Magnesium	ug/L	1000	1020	102	85-115	
Manganese	ug/L	80	77.7	97	85-115	ES
Potassium	ug/L	1000	965	96	85-115	ES
Sodium	ug/L	1000	1020	102	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514621 1514622

Parameter	Units	10240339036 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.056	.08	.08	0.14	0.13	107	97	70-130	6	20	
Cadmium	mg/L	0.0054	.08	.08	0.089	0.085	105	99	70-130	5	20	
Calcium	ug/L	56300	1000	1000	61400	58500	508	223	70-130	5	20	ES
Copper	mg/L	0.66	.08	.08	0.83	0.80	216	179	70-130	4	20	M1
Iron	ug/L	27700	1000	1000	31400	29400	372	175	70-130	7	20	
Lead	mg/L	0.72	.08	.08	0.86	0.83	168	135	70-130	3	20	M1
Magnesium	ug/L	13400	1000	1000	16400	15500	301	219	70-130	5	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514621 1514622

Parameter	Units	10240339036 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese	ug/L	1510	80	80	1830	1730	393	270	70-130	6	20	ES
Potassium	ug/L	10400	1000	1000	13600	12600	319	226	70-130	7	20	ES
Sodium	ug/L	4970	1000	1000	6930	6630	196	166	70-130	4	20	
Zinc	mg/L	2.1	.08	.08	2.3	2.3	307	232	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41686 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10240339015

METHOD BLANK: 1517878 — Matrix: Water
Associated Lab Samples: 10240339015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/10/13 02:37	
Cadmium	mg/L	ND	0.000080	09/10/13 02:37	
Copper	mg/L	ND	0.00050	09/10/13 02:37	
Lead	mg/L	ND	0.00010	09/10/13 02:37	
Zinc	mg/L	ND	0.0050	09/10/13 02:37	

LABORATORY CONTROL SAMPLE: 1517879

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.076	95	85-115	
Cadmium	mg/L	.08	0.082	103	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Lead	mg/L	.08	0.082	103	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1517880 1517881

Parameter	Units	10240339015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.021	.08	.08	0.097	0.098	94	95	70-130	.8	20	
Cadmium	mg/L	0.00083	.08	.08	0.082	0.082	101	102	70-130	.7	20	
Copper	mg/L	0.23	.08	.08	0.33	0.33	130	132	70-130	.4	20	M1
Lead	mg/L	0.045	.08	.08	0.13	0.13	110	110	70-130	.1	20	
Zinc	mg/L	0.18	.08	.08	0.28	0.28	122	118	70-130	1	20	

MATRIX SPIKE SAMPLE: 1517882

Parameter	Units	10240591005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1.3 ug/L	.08	0.078	96	70-130	
Cadmium	mg/L	ND	.08	0.082	103	70-130	
Copper	mg/L	1.3 ug/L	.08	0.083	102	70-130	
Lead	mg/L	0.14 ug/L	.08	0.083	103	70-130	
Zinc	mg/L	10.6 ug/L	.08	0.093	103	70-130	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41579 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

METHOD BLANK: 1513998 — Matrix: Water
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/11/13 16:57	
Cadmium, Dissolved	mg/L	ND	0.000080	09/11/13 16:57	
Copper, Dissolved	mg/L	ND	0.00050	09/11/13 16:57	
Lead, Dissolved	mg/L	ND	0.00010	09/11/13 16:57	
Zinc, Dissolved	mg/L	ND	0.0050	09/11/13 16:57	

LABORATORY CONTROL SAMPLE: 1513999

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.078	97	85-115	
Cadmium, Dissolved	mg/L	.08	0.076	96	85-115	
Copper, Dissolved	mg/L	.08	0.081	102	85-115	
Lead, Dissolved	mg/L	.08	0.075	94	85-115	
Zinc, Dissolved	mg/L	.08	0.078	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514000 1514001

Parameter	Units	10240339001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0057	.08	.08	0.084	0.084	97	97	70-130	.1	20	
Cadmium, Dissolved	mg/L	0.00032	.08	.08	0.078	0.078	97	97	70-130	.5	20	
Copper, Dissolved	mg/L	0.047	.08	.08	0.13	0.13	100	101	70-130	.7	20	
Lead, Dissolved	mg/L	0.0019	.08	.08	0.077	0.077	94	94	70-130	.1	20	
Zinc, Dissolved	mg/L	0.039	.08	.08	0.11	0.12	94	97	70-130	3	20	

MATRIX SPIKE SAMPLE: 1514002

Parameter	Units	10240339011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.011	.08	0.090	98	70-130	
Cadmium, Dissolved	mg/L	0.00052	.08	0.079	98	70-130	
Copper, Dissolved	mg/L	0.091	.08	0.17	105	70-130	
Lead, Dissolved	mg/L	0.0029	.08	0.079	96	70-130	
Zinc, Dissolved	mg/L	0.059	.08	0.14	97	70-130	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41580 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

METHOD BLANK: 1514003 — Matrix: Water
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/10/13 12:39	
Cadmium, Dissolved	mg/L	ND	0.000080	09/10/13 12:39	
Copper, Dissolved	mg/L	ND	0.00050	09/10/13 12:39	
Lead, Dissolved	mg/L	ND	0.00010	09/10/13 12:39	
Zinc, Dissolved	mg/L	ND	0.0050	09/10/13 12:39	

LABORATORY CONTROL SAMPLE: 1514004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.077	97	85-115	
Cadmium, Dissolved	mg/L	.08	0.081	101	85-115	
Copper, Dissolved	mg/L	.08	0.080	100	85-115	
Lead, Dissolved	mg/L	.08	0.081	102	85-115	
Zinc, Dissolved	mg/L	.08	0.079	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514005 1514006

Parameter	Units	10240339021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0064	.08	.08	0.083	0.088	96	102	70-130	5	20	
Cadmium, Dissolved	mg/L	0.00033	.08	.08	0.080	0.085	100	106	70-130	6	20	
Copper, Dissolved	mg/L	0.047	.08	.08	0.13	0.13	98	106	70-130	6	20	
Lead, Dissolved	mg/L	0.0037	.08	.08	0.080	0.085	95	101	70-130	6	20	
Zinc, Dissolved	mg/L	0.074	.08	.08	0.15	0.16	94	106	70-130	6	20	

MATRIX SPIKE SAMPLE: 1519252

Parameter	Units	10240339032 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0067	.08	0.083	95	70-130	
Cadmium, Dissolved	mg/L	0.00015	.08	0.081	101	70-130	
Copper, Dissolved	mg/L	0.077	.08	0.15	96	70-130	
Lead, Dissolved	mg/L	0.00077	.08	0.077	95	70-130	
Zinc, Dissolved	mg/L	0.015	.08	0.093	97	70-130	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: MPRP/41596 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

METHOD BLANK: 1514626 — Matrix: Water
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/10/13 08:47	
Cadmium, Dissolved	mg/L	ND	0.000080	09/10/13 08:47	
Copper, Dissolved	mg/L	ND	0.00050	09/10/13 08:47	
Lead, Dissolved	mg/L	ND	0.00010	09/10/13 08:47	
Zinc, Dissolved	mg/L	ND	0.0050	09/10/13 08:47	

LABORATORY CONTROL SAMPLE: 1514627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.083	103	85-115	
Cadmium, Dissolved	mg/L	.08	0.087	108	85-115	
Copper, Dissolved	mg/L	.08	0.086	107	85-115	
Lead, Dissolved	mg/L	.08	0.087	108	85-115	
Zinc, Dissolved	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1514628 — 1514629

Parameter	Units	10240339036 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0072	.08	.08	0.087	0.089	100	102	70-130	2	20	
Cadmium, Dissolved	mg/L	0.00026	.08	.08	0.083	0.086	104	107	70-130	3	20	
Copper, Dissolved	mg/L	0.050	.08	.08	0.13	0.14	101	107	70-130	4	20	
Lead, Dissolved	mg/L	0.0025	.08	.08	0.083	0.085	100	103	70-130	3	20	
Zinc, Dissolved	mg/L	0.034	.08	.08	0.12	0.12	103	109	70-130	4	20	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WET/33876 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10240339012, 10240339042

METHOD BLANK: 1604009 — Matrix: Water
Associated Lab Samples: 10240339012, 10240339042

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WET/32079 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10240339001, 10240339002

METHOD BLANK: 1515706 | Matrix: Water
Associated Lab Samples: 10240339001, 10240339002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/03/13 11:20	

METHOD BLANK: 1515710 | Matrix: Water
Associated Lab Samples: 10240339001, 10240339002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/03/13 11:21	

LABORATORY CONTROL SAMPLE: 1515707

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94.8	95	80-120	

SAMPLE DUPLICATE: 1515708

Parameter	Units	10240591002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	21.3	35.7	51	10	D6,D8

SAMPLE DUPLICATE: 1515709

Parameter	Units	10240339002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	437	450	3	10	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WET/32080 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020, 10240339021, 10240339022

METHOD BLANK: 1515752 — Matrix: Water
Associated Lab Samples: 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020, 10240339021, 10240339022

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/04/13 11:18	

METHOD BLANK: 1515755 — Matrix: Water
Associated Lab Samples: 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020, 10240339021, 10240339022

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/04/13 11:18	

LABORATORY CONTROL SAMPLE: 1516322

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	85.4	85	80-120	

SAMPLE DUPLICATE: 1515753

Parameter	Units	10240339006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1515754

Parameter	Units	10240339022 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WET/32103 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

METHOD BLANK: 1516720 — Matrix: Water
Associated Lab Samples: 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/04/13 17:38	

METHOD BLANK: 1516724 — Matrix: Water
Associated Lab Samples: 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/04/13 17:38	

LABORATORY CONTROL SAMPLE: 1516721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	91.8	92	80-120	

SAMPLE DUPLICATE: 1516722

Parameter	Units	10240339023 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	49.0	53.4	9	10	

SAMPLE DUPLICATE: 1516723

Parameter	Units	10240395003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WET/32104 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

METHOD BLANK: 1516730 — Matrix: Water
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/04/13 17:19	

METHOD BLANK: 1516734 — Matrix: Water
Associated Lab Samples: 10240339036, 10240339037, 10240339038, 10240339039, 10240339040, 10240339041, 10240339042, 10240339043, 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/04/13 17:20	

LABORATORY CONTROL SAMPLE: 1516731

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	108	108	80-120	

SAMPLE DUPLICATE: 1516732

Parameter	Units	10240395004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1516733

Parameter	Units	10240446001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	39.3	49.8	24	10	D8

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WET/33874 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 10240339012, 10240339042

LABORATORY CONTROL SAMPLE: 1603988

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	99	98-102	H6

SAMPLE DUPLICATE: 1603989

Parameter	Units	10240339042 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.5	6.5	.2	3	H6

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WETA/17057 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10240339012, 10240339042

METHOD BLANK: 1604003 | Matrix: Water
Associated Lab Samples: 10240339012, 10240339042

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WETA/15981 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

METHOD BLANK: 1518277 — Matrix: Water
Associated Lab Samples: 10240339001, 10240339002, 10240339003, 10240339004, 10240339005, 10240339006, 10240339007, 10240339008, 10240339009, 10240339010, 10240339011, 10240339012, 10240339013, 10240339014, 10240339015, 10240339016, 10240339017, 10240339018, 10240339019, 10240339020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/06/13 11:49	

LABORATORY CONTROL SAMPLE: 1518278

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518279 — 1518280

Parameter	Units	10240339001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	11.7	20	20	29.3	29.4	88	88	80-120	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518281 — 1518282

Parameter	Units	10240339011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	18.9	20	20	36.8	36.6	90	89	80-120	.3	30	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WETA/15982 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035, 10240339036, 10240339037, 10240339038, 10240339039, 10240339040

METHOD BLANK: 1518302 — Matrix: Water
Associated Lab Samples: 10240339021, 10240339022, 10240339023, 10240339024, 10240339025, 10240339026, 10240339027, 10240339028, 10240339029, 10240339030, 10240339031, 10240339032, 10240339033, 10240339034, 10240339035, 10240339036, 10240339037, 10240339038, 10240339039, 10240339040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/06/13 12:26	

LABORATORY CONTROL SAMPLE: 1518303

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.9	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518304 — 1518305

Parameter	Units	10240339021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	13.1	20	20	30.9	31.1	89	90	80-120	.5	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518306 — 1518307

Parameter	Units	10240339031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	17.2	20	20	34.9	35.0	89	89	80-120	.08	30	

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WETA/16017 Analysis Method: ASTM D516
QC Batch Method: ASTM D516 Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10240339041, 10240339042, 10240339043, 10240339044

METHOD BLANK: 1523486 Matrix: Water
Associated Lab Samples: 10240339041, 10240339042, 10240339043, 10240339044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/13/13 09:13	

LABORATORY CONTROL SAMPLE: 1523487

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.2	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523488 1523489

Parameter	Units	10240339041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.8	20	20	28.5	28.2	89	87	80-120	.9	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523490 1523491

Parameter	Units	10241031006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	3.6	20	20	29.3	29.4	129	129	80-120	.2	30	M1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WETA/17041 — Analysis Method: SM 4500-Cl E
QC Batch Method: SM 4500-Cl E — Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10240339012, 10240339042

METHOD BLANK: 1603873 — Matrix: Water
Associated Lab Samples: 10240339012, 10240339042

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 — 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 — 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

QC Batch: WETA/17023 | Analysis Method: SM 4500-NO2 B
QC Batch Method: SM 4500-NO2 B | Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10240339012, 10240339042

METHOD BLANK: 1603178 | Matrix: Water
Associated Lab Samples: 10240339012, 10240339042

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
ES	The reported result is estimated because one or more of the constituent results are qualified as such.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240339001	**SD0639-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339002	**SD0640-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339003	**SD0641-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339004	**SD0642-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339005	**SD0643-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339006	**SD0644-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339007	**SD0645-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339008	**SD0646-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339009	**SD0647-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339010	**SD0657-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339011	**SD0658-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339012	**SD0659-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339013	**SD0660-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339014	**SD0661-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339015	**SD0662-082613**	EPA 200.8	MPRP/41686	EPA 200.8	ICPM/17484
10240339016	**SD0663-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339017	**SD0664-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339018	**SD0665-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339019	**SD0666-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339020	**SD0667-082613**	EPA 200.8	MPRP/41576	EPA 200.8	ICPM/17424
10240339021	**SD0668-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339022	**SD0669-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339023	**SD0670-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339024	**SD0671-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339025	**SD0672-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339026	**SD0673-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339027	**SD0674-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339028	**SD0675-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339029	**SD0676-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339030	**SD0677-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339031	**SD0678-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339032	**SD0679-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339033	**SD0680-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339034	**SD0681-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339035	**SD0682-082613**	EPA 200.8	MPRP/41577	EPA 200.8	ICPM/17493
10240339036	**SD0648-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339037	**SD0649-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339038	**SD0650-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339039	**SD0651-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339040	**SD0652-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339041	**SD0653-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339042	**SD0654-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339043	**SD0655-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339044	**SD0656-082613**	EPA 200.8	MPRP/41595	EPA 200.8	ICPM/17512
10240339001	**SD0639-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339002	**SD0640-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240339003	**SD0641-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339004	**SD0642-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339005	**SD0643-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339006	**SD0644-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339007	**SD0645-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339008	**SD0646-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339009	**SD0647-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339010	**SD0657-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339011	**SD0658-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339012	**SD0659-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339013	**SD0660-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339014	**SD0661-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339015	**SD0662-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339016	**SD0663-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339017	**SD0664-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339018	**SD0665-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339019	**SD0666-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339020	**SD0667-082613**	EPA 200.8	MPRP/41579	EPA 200.8	ICPM/17481
10240339021	**SD0668-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339022	**SD0669-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339023	**SD0670-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339024	**SD0671-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339025	**SD0672-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339026	**SD0673-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339027	**SD0674-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339028	**SD0675-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339029	**SD0676-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339030	**SD0677-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339031	**SD0678-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339032	**SD0679-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339033	**SD0680-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339034	**SD0681-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339035	**SD0682-082613**	EPA 200.8	MPRP/41580	EPA 200.8	ICPM/17492
10240339036	**SD0648-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339037	**SD0649-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339038	**SD0650-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339039	**SD0651-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339040	**SD0652-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339041	**SD0653-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339042	**SD0654-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339043	**SD0655-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339044	**SD0656-082613**	EPA 200.8	MPRP/41596	EPA 200.8	ICPM/17511
10240339001	**SD0639-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339002	**SD0640-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339003	**SD0641-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339004	**SD0642-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339005	**SD0643-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240339006	**SD0644-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339007	**SD0645-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339008	**SD0646-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339009	**SD0647-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339010	**SD0657-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339011	**SD0658-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339012	**SD0659-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339013	**SD0660-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339014	**SD0661-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339015	**SD0662-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339016	**SD0663-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339017	**SD0664-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339018	**SD0665-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339019	**SD0666-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339020	**SD0667-082613**	EPA 245.1	MERP/9149	EPA 245.1	MERC/10485
10240339021	**SD0668-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339022	**SD0669-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339023	**SD0670-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339024	**SD0671-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339025	**SD0672-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339026	**SD0673-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339027	**SD0674-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339028	**SD0675-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339029	**SD0676-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339030	**SD0677-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339031	**SD0678-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339032	**SD0679-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339033	**SD0680-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339034	**SD0681-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339035	**SD0682-082613**	EPA 245.1	MERP/9152	EPA 245.1	MERC/10487
10240339036	**SD0648-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339037	**SD0649-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339038	**SD0650-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339039	**SD0651-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339040	**SD0652-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339041	**SD0653-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339042	**SD0654-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339043	**SD0655-082613**	EPA 245.1	MERP/9159	EPA 245.1	MERC/10489
10240339044	**SD0656-082613**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240339001	**SD0639-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339002	**SD0640-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339003	**SD0641-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339004	**SD0642-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339005	**SD0643-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339006	**SD0644-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339007	**SD0645-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339008	**SD0646-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486

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(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240339009	**SD0647-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339010	**SD0657-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339011	**SD0658-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339012	**SD0659-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339013	**SD0660-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339014	**SD0661-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339015	**SD0662-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339016	**SD0663-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339017	**SD0664-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339018	**SD0665-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339019	**SD0666-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339020	**SD0667-082613**	EPA 245.1	MERP/9150	EPA 245.1	MERC/10486
10240339021	**SD0668-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339022	**SD0669-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339023	**SD0670-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339024	**SD0671-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339025	**SD0672-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339026	**SD0673-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339027	**SD0674-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339028	**SD0675-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339029	**SD0676-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339030	**SD0677-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339031	**SD0678-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339032	**SD0679-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339033	**SD0680-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339034	**SD0681-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339035	**SD0682-082613**	EPA 245.1	MERP/9151	EPA 245.1	MERC/10488
10240339036	**SD0648-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339037	**SD0649-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339038	**SD0650-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339039	**SD0651-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339040	**SD0652-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339041	**SD0653-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339042	**SD0654-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339043	**SD0655-082613**	EPA 245.1	MERP/9157	EPA 245.1	MERC/10490
10240339044	**SD0656-082613**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240339012	**SD0659-082613**	SM 2320B	WET/33876		
10240339042	**SD0654-082613**	SM 2320B	WET/33876		
10240339001	**SD0639-082613**	SM 2540D	WET/32079		
10240339002	**SD0640-082613**	SM 2540D	WET/32079		
10240339003	**SD0641-082613**	SM 2540D	WET/32080		
10240339004	**SD0642-082613**	SM 2540D	WET/32080		
10240339005	**SD0643-082613**	SM 2540D	WET/32080		
10240339006	**SD0644-082613**	SM 2540D	WET/32080		
10240339007	**SD0645-082613**	SM 2540D	WET/32080		
10240339008	**SD0646-082613**	SM 2540D	WET/32080		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240339009	**SD0647-082613**	SM 2540D	WET/32080		
10240339010	**SD0657-082613**	SM 2540D	WET/32080		
10240339011	**SD0658-082613**	SM 2540D	WET/32080		
10240339012	**SD0659-082613**	SM 2540D	WET/32080		
10240339013	**SD0660-082613**	SM 2540D	WET/32080		
10240339014	**SD0661-082613**	SM 2540D	WET/32080		
10240339015	**SD0662-082613**	SM 2540D	WET/32080		
10240339016	**SD0663-082613**	SM 2540D	WET/32080		
10240339017	**SD0664-082613**	SM 2540D	WET/32080		
10240339018	**SD0665-082613**	SM 2540D	WET/32080		
10240339019	**SD0666-082613**	SM 2540D	WET/32080		
10240339020	**SD0667-082613**	SM 2540D	WET/32080		
10240339021	**SD0668-082613**	SM 2540D	WET/32080		
10240339022	**SD0669-082613**	SM 2540D	WET/32080		
10240339023	**SD0670-082613**	SM 2540D	WET/32103		
10240339024	**SD0671-082613**	SM 2540D	WET/32103		
10240339025	**SD0672-082613**	SM 2540D	WET/32103		
10240339026	**SD0673-082613**	SM 2540D	WET/32103		
10240339027	**SD0674-082613**	SM 2540D	WET/32103		
10240339028	**SD0675-082613**	SM 2540D	WET/32103		
10240339029	**SD0676-082613**	SM 2540D	WET/32103		
10240339030	**SD0677-082613**	SM 2540D	WET/32103		
10240339031	**SD0678-082613**	SM 2540D	WET/32103		
10240339032	**SD0679-082613**	SM 2540D	WET/32103		
10240339033	**SD0680-082613**	SM 2540D	WET/32103		
10240339034	**SD0681-082613**	SM 2540D	WET/32103		
10240339035	**SD0682-082613**	SM 2540D	WET/32103		
10240339036	**SD0648-082613**	SM 2540D	WET/32104		
10240339037	**SD0649-082613**	SM 2540D	WET/32104		
10240339038	**SD0650-082613**	SM 2540D	WET/32104		
10240339039	**SD0651-082613**	SM 2540D	WET/32104		
10240339040	**SD0652-082613**	SM 2540D	WET/32104		
10240339041	**SD0653-082613**	SM 2540D	WET/32104		
10240339042	**SD0654-082613**	SM 2540D	WET/32104		
10240339043	**SD0655-082613**	SM 2540D	WET/32104		
10240339044	**SD0656-082613**	SM 2540D	WET/32104		
10240339012	**SD0659-082613**	SM 4500-H+B	WET/33874		
10240339042	**SD0654-082613**	SM 4500-H+B	WET/33874		
10240339012	**SD0659-082613**	SM 4500-NO3 H	WETA/17057		
10240339042	**SD0654-082613**	SM 4500-NO3 H	WETA/17057		
10240339001	**SD0639-082613**	ASTM D516	WETA/15981		
10240339002	**SD0640-082613**	ASTM D516	WETA/15981		
10240339003	**SD0641-082613**	ASTM D516	WETA/15981		
10240339004	**SD0642-082613**	ASTM D516	WETA/15981		
10240339005	**SD0643-082613**	ASTM D516	WETA/15981		
10240339006	**SD0644-082613**	ASTM D516	WETA/15981		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU BUTTE HILL DIAGNOSTIC
Pace Project No.: 10240339

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240339007	**SD0645-082613**	ASTM D516	WETA/15981		
10240339008	**SD0646-082613**	ASTM D516	WETA/15981		
10240339009	**SD0647-082613**	ASTM D516	WETA/15981		
10240339010	**SD0657-082613**	ASTM D516	WETA/15981		
10240339011	**SD0658-082613**	ASTM D516	WETA/15981		
10240339012	**SD0659-082613**	ASTM D516	WETA/15981		
10240339013	**SD0660-082613**	ASTM D516	WETA/15981		
10240339014	**SD0661-082613**	ASTM D516	WETA/15981		
10240339015	**SD0662-082613**	ASTM D516	WETA/15981		
10240339016	**SD0663-082613**	ASTM D516	WETA/15981		
10240339017	**SD0664-082613**	ASTM D516	WETA/15981		
10240339018	**SD0665-082613**	ASTM D516	WETA/15981		
10240339019	**SD0666-082613**	ASTM D516	WETA/15981		
10240339020	**SD0667-082613**	ASTM D516	WETA/15981		
10240339021	**SD0668-082613**	ASTM D516	WETA/15982		
10240339022	**SD0669-082613**	ASTM D516	WETA/15982		
10240339023	**SD0670-082613**	ASTM D516	WETA/15982		
10240339024	**SD0671-082613**	ASTM D516	WETA/15982		
10240339025	**SD0672-082613**	ASTM D516	WETA/15982		
10240339026	**SD0673-082613**	ASTM D516	WETA/15982		
10240339027	**SD0674-082613**	ASTM D516	WETA/15982		
10240339028	**SD0675-082613**	ASTM D516	WETA/15982		
10240339029	**SD0676-082613**	ASTM D516	WETA/15982		
10240339030	**SD0677-082613**	ASTM D516	WETA/15982		
10240339031	**SD0678-082613**	ASTM D516	WETA/15982		
10240339032	**SD0679-082613**	ASTM D516	WETA/15982		
10240339033	**SD0680-082613**	ASTM D516	WETA/15982		
10240339034	**SD0681-082613**	ASTM D516	WETA/15982		
10240339035	**SD0682-082613**	ASTM D516	WETA/15982		
10240339036	**SD0648-082613**	ASTM D516	WETA/15982		
10240339037	**SD0649-082613**	ASTM D516	WETA/15982		
10240339038	**SD0650-082613**	ASTM D516	WETA/15982		
10240339039	**SD0651-082613**	ASTM D516	WETA/15982		
10240339040	**SD0652-082613**	ASTM D516	WETA/15982		
10240339041	**SD0653-082613**	ASTM D516	WETA/16017		
10240339042	**SD0654-082613**	ASTM D516	WETA/16017		
10240339043	**SD0655-082613**	ASTM D516	WETA/16017		
10240339044	**SD0656-082613**	ASTM D516	WETA/16017		
10240339012	**SD0659-082613**	SM 4500-Cl E	WETA/17041		
10240339042	**SD0654-082613**	SM 4500-Cl E	WETA/17041		
10240339012	**SD0659-082613**	SM 4500-NO2 B	WETA/17023		
10240339042	**SD0654-082613**	SM 4500-NO2 B	WETA/17023		

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10240339

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0639-082613	8/28/2013	10:11		x			3	1		2				x	x	x								001
	SD0640-082613	8/28/2013	10:16		x			3	1		2				x	x	x								002
	SD0641-082613	8/28/2013	10:20		x			3	1		2				x	x	x								003
	SD0642-082613	8/28/2013	10:25		x			3	1		2				x	x	x								004
	SD0643-082613	8/28/2013	10:29		x			3	1		2				x	x	x								005
	SD0644-082613	8/28/2013	10:32		x			3	1		2				x	x	x								006
	SD0645-082613	8/28/2013	10:36		x			3	1		2				x	x	x								007
	SD0646-082613	8/28/2013	10:39		x			3	1		2				x	x	x								008
	SD0647-082613	8/28/2013	10:42		x			3	1		2				x	x	x								009
X	SD0648-082613	8/28/2013	10:45		x			3	1		2				x	x	x								036

Sampler's Name: Janelle Fitzpatrick	**Relinquished By / Affiliation**	**Date**	**Time**	**Accepted By / Affiliation**	**Date** / **Time**
Sampler's Company: TREC INC	JFitz	8/28/13	1403	[illegible]	8.29.13 / 9:14
Shipment Method: Fed Ex Ship Date: 8/28/2013				[illegible]	8/30/13 / 0915
Shipment Tracking No: 8006 6032 3518					

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 40.16 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

2.4, 3.0 CW 8.29.13

8/30 Y Y 2.6 N N

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision OOC-BU OOC-RM	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mai Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
X	SD0649-082613	8/28/2013	10:49		x			3	1		2				x	x	x								037
X	SD0650-082613	8/28/2013	10:52		x			3	1		2				x	x	x								038
X	SD0651-082613	8/28/2013	10:56		x			3	1		2				x	x	x								039
X	SD0652-082613	8/28/2013	10:59		x			3	1		2				x	x	x								040
X	SD0653-082613	8/28/2013	11:03		x			3	1		2				x	x	x								041
X	SD0654-082613	8/28/2013	11:07		x			3	1		2				x	x	x								042
X	SD0655-082613	8/28/2013	11:12		x			3	1		2				x	x	x								043
X	SD0656-082613	8/28/2013	11:16		x			3	1		2				x	x	x								044
	SD0657-082613	8/28/2013	11:19		x			3	1		2				x	x	x								010
	SD0658-082613	8/28/2013	11:22		x			3	1		2				x	x	x								011

Report Type & QC Level
Standard ____
Full Data Package ____

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Janelle Fitzpatrick								
Sampler's Company:	TREC INC			[signature]	8/28/13	1403	[signature] Pace	8.29.13	9:14
Shipment Method:	Fed Ex	Ship Date:	8/28/2013						
Shipment Tracking No:	8006 6032 3518								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.0 1.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

2.4, 30

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision OOC-BU OOC-RM	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		Requested Analyses: As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0659-082613	8/28/2013	11:25		x			3	1		2				x	x	x								012
	SD0660-082613	8/28/2013	11:31		x			3	1		2				x	x	x								013
	SD0661-082613	8/28/2013	11:34		x			3	1		2				x	x	x								014
	SD0662-082613	8/28/2013	11:38		x			3	1		2				x	x	x								015
	SD0663-082613	8/28/2013	11:42		x			3	1		2				x	x	x								016
	SD0664-082613	8/28/2013	11:45		x			3	1		2				x	x	x								017
	SD0665-082613	8/28/2013	11:48		x			3	1		2				x	x	x								018
	SD0666-082613	8/28/2013	11:52		x			3	1		2				x	x	x								019
	SD0667-082613	8/28/2013	11:56		x			3	1		2				x	x	x								020
	SD0668-082613	8/28/2013	11:59		x			3	1		2				x	x	x								021

Sampler's Name: Janelle Fitzpatrick	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: TREC INC		8/28/13	1403		8.28.13	9:14
Shipment Method: Fed Ex Ship Date: 8/28/2013						
Shipment Tracking No: 8006 6032 3518						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.0 1.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

2.4, 3.0

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar	Lindy Hanson		
BP PM Phone:	723-1838		
BP PM Email:	lindy.hansont@bp.com		

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0669-082613	8/28/2013	12:03		x			3	1		2				x	x	x								022
	SD0670-082613	8/28/2013	12:07		x			3	1		2				x	x	x								023
	SD0671-082613	8/28/2013	12:10		x			3	1		2				x	x	x								024
	SD0672-082613	8/28/2013	12:13		x			3	1		2				x	x	x								025
	SD0673-082613	8/28/2013	12:16		x			3	1		2				x	x	x								026
	SD0674-082613	8/28/2013	12:20		x			3	1		2				x	x	x								027
	SD0675-082613	8/28/2013	12:27		x			3	1		2				x	x	x								028
	SD0676-082613	8/28/2013	12:31		x			3	1		2				x	x	x								029
	SD0677-082613	8/28/2013	12:34		x			3	1		2				x	x	x								030
	SD0678-082613	8/28/2013	12:39		x			3	1		2				x	x	x								031

Sampler's Name:	Janelle Fitzpatrick	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC		8/28/13	1403		8.29.13	9:14
Shipment Method:	Fed Ex Ship Date: 8/28/2013						
Shipment Tracking No:	8006 6032 3518						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.8, 4.6 °F/C 2.4, 3.8 | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0679-082613	8/28/2013	12:42		x			3	1		2				x	x	x								032
	SD0680-082613	8/28/2013	12:45		x			3	1		2				x	x	x								033
	SD0681-082613	8/28/2013	12:48		x			3	1		2				x	x	x								034
	SD0682-082613	8/28/2013	12:52		x			3	1		2				x	x	x								035

Sampler's Name: Janelle Fitzpatrick	**Relinquished By / Affiliation**	**Date**	**Time**	**Accepted By / Affiliation**	**Date** / **Time**
Sampler's Company: TREC INC	[signature]	8/28/13	1403	[signature]	8.29.13 / 9:14
Shipment Method: Fed Ex Ship Date: 8/28/2013					
Shipment Tracking No: 8006 6032 3518					

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.0, 1.6 °F/C 2.4, 3.0 | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: B.P-TREC, Inc

Project #: WO# : 10240339

10240339

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A912167504 ☐ 80512447 ☑ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.6, 1.2, 2.0, 2.6 **Cooler Temp Corrected (°C):** 4.0, 1.6, 2.4, 3.0 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.4 **Date and Initials of Person Examining Contents:** CW 8.29.13

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix:	☐ Yes	☑ No	☐ N/A	12. Missing Samples SD0648-082613 – SD0656-082613 Impp. 2 HNO_3
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 2/2
Per method, VOA pH is checked after analysis				Initial when completed: CW Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☑ Yes	☐ No	☑ N/A	14. CW 8.29.13
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Tina/Craig Date/Time: 8/29

Comments/Resolution: Fedex lost 1 Cooler, notified TREC ok to add to original WO

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 11:45	Temp: 3.6 2.0 1.2 2.6	Corrected Temp: 4.0 2.4 1.6 3.0	
Time: 11:54	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: [signature] **Date:** 8/30/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical	Document Name: **SCUR Exceptions Form**	Document Revised: 16Apr2012 Page 1 of 1
	Document No.: **F-MN-L-220-Rev.00**	Issuing Authority: Pace Minnesota Quality Office

Workorder #: 10240339

Issue	Sample ID	Container Type/#
Correction factor		
7958 2237 3503	3.6 4.0	
" 3488	1.2 1.6	
" 3499	2.0 2.4	
8006 6032 3518	2.6 3.0	
7958 2237 3514	2.1 2.6	rec'd 8/30

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: B.P. Trec.

Project #: WO#: 10240339

10240339

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 7958 2237 3514

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.1 **Cooler Temp Corrected (°C):** 2.6 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.5 **Date and Initials of Person Examining Contents:** 8-30-13

Comments:

Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # SD0648-SD0656 2/2
Per method, VOA pH is checked after analysis				Initial when completed: CW Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 10:30	Temp: 2.1	Corrected Temp: 2.6
Time: 10:41	put in cooler	
Time:	Temp:	Corrected Temp:

lost Cooler

Project Manager Review: Date: 8/30/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory on September 04, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request.
Sample effected: 013

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10240702001	**SD0683-082813**	Water	08/30/13 08:34	09/04/13 09:50
10240702002	**SD0684-082813**	Water	08/30/13 08:44	09/04/13 09:50
10240702003	**SD0685-082813**	Water	08/30/13 08:48	09/04/13 09:50
10240702004	**SD0686-082813**	Water	08/30/13 08:51	09/04/13 09:50
10240702005	**SD0687-082813**	Water	08/30/13 08:54	09/04/13 09:50
10240702006	**SD0688-082813**	Water	08/30/13 08:57	09/04/13 09:50
10240702007	**SD0689-082813**	Water	08/30/13 08:59	09/04/13 09:50
10240702008	**SD0690-082813**	Water	08/30/13 09:01	09/04/13 09:50
10240702009	**SD0691-082813**	Water	08/30/13 09:03	09/04/13 09:50
10240702010	**SD0692-082813**	Water	08/30/13 09:09	09/04/13 09:50
10240702011	**SD0693-082813**	Water	08/30/13 09:12	09/04/13 09:50
10240702012	**SD0694-082813**	Water	08/30/13 09:15	09/04/13 09:50
10240702013	**SD0695-082813**	Water	08/30/13 09:17	09/04/13 09:50
10240702014	**SD0696-082813**	Water	08/30/13 09:20	09/04/13 09:50
10240702015	**SD0697-082813**	Water	08/30/13 09:22	09/04/13 09:50
10240702016	**SD0698-082813**	Water	08/30/13 09:26	09/04/13 09:50
10240702017	**SD0699-082813**	Water	08/30/13 09:29	09/04/13 09:50
10240702018	**SD0700-082813**	Water	08/30/13 09:31	09/04/13 09:50
10240702019	**SD0701-082813**	Water	08/30/13 09:34	09/04/13 09:50
10240702020	**SD0702-082813**	Water	08/30/13 09:40	09/04/13 09:50
10240702021	**SD0703-082813**	Water	08/30/13 09:42	09/04/13 09:50
10240702022	**SD0704-082813**	Water	08/30/13 09:44	09/04/13 09:50
10240702023	**SD0705-082813**	Water	08/30/13 09:46	09/04/13 09:50
10240702024	**SD0706-082813**	Water	08/30/13 09:49	09/04/13 09:50
10240702025	**SD0707-082813**	Water	08/30/13 09:51	09/04/13 09:50
10240702026	**SD0708-082813**	Water	08/30/13 09:56	09/04/13 09:50
10240702027	**SD0709-082813**	Water	08/30/13 09:58	09/04/13 09:50
10240702028	**SD0710-082813**	Water	08/30/13 11:32	09/04/13 09:50
10240702029	**SD0711-082813**	Water	08/30/13 11:35	09/04/13 09:50

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10240702001	**SD0683-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702002	**SD0684-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702003	**SD0685-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702004	**SD0686-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702005	**SD0687-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702006	**SD0688-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702007	**SD0689-082813**	EPA 200.8	TT3	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702008	**SD0690-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702009	**SD0691-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702010	**SD0692-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702011	**SD0693-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702012	**SD0694-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702013	**SD0695-082813**	EPA 200.8	TT3	12
		EPA 200.8	TT3	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	HNKH	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10240702014	**SD0696-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702015	**SD0697-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702016	**SD0698-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702017	**SD0699-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702018	**SD0700-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702019	**SD0701-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702020	**SD0702-082813**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702021	**SD0703-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702022	**SD0704-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702023	**SD0705-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702024	**SD0706-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
10240702025	**SD0707-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702026	**SD0708-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702027	**SD0709-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702028	**SD0710-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10240702029	**SD0711-082813**	EPA 200.8	RJS	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
29 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41668

B: Analyte was detected in the associated method blank.

- BLANK for HBN 266824 [MPRP/416 (Lab ID: 1517081)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41669

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240594001,10240702022

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1517089)
  - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 1517089)
  - Zinc

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

QC Batch: MPRP/41668

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240702002,10240702011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1519525)
  - Lead
- MSD (Lab ID: 1519526)
  - Lead

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
29 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41665

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240702002,10240702011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1519528)
  - Zinc, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
29 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/9239

B: Analyte was detected in the associated method blank.

- BLANK for HBN 268121 [MERP/923 (Lab ID: 1524383)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9239

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240702003,10240702018

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1524879)
  - Mercury

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
29 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/9177

B: Analyte was detected in the associated method blank.

- BLANK for HBN 266786 [MERP/917 (Lab ID: 1516853)
  - Mercury, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0695-082813 (Lab ID: 10240702013)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
29 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0695-082813 (Lab ID: 10240702013)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0695-082813 (Lab ID: 10240702013)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
29 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0695-082813 (Lab ID: 10240702013)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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(612)607-1700

PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0695-082813 (Lab ID: 10240702013)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0683-082813 **Lab ID: 10240702001** Collected: 08/30/13 08:34 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 05:46	7440-38-2	
Cadmium	**0.00087**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 05:46	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 05:46	7440-50-8	
Lead	**0.067**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 05:46	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 05:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0064**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 00:31	7440-38-2	
Cadmium, Dissolved	**0.00031**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 00:31	7440-43-9	
Copper, Dissolved	**0.048**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 00:31	7440-50-8	
Lead, Dissolved	**0.0036**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 00:31	7439-92-1	
Zinc, Dissolved	**0.071**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 00:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000095J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 15:59	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**60.3**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.2**	mg/L	2.5	1.2	1		09/06/13 13:32	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0684-082813 **Lab ID: 10240702002** Collected: 08/30/13 08:44 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 05:57	7440-38-2	
Cadmium	**0.00086**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 05:57	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 05:57	7440-50-8	
Lead	**0.082**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 05:57	7439-92-1	M1
Zinc	**0.34**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 05:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0058**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 00:42	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 00:42	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 00:42	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 00:42	7439-92-1	
Zinc, Dissolved	**0.067**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 00:42	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:01	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:25	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**112**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.7**	mg/L	2.5	1.2	1		09/06/13 13:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0685-082813 **Lab ID: 10240702003** Collected: 08/30/13 08:48 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 06:18	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 06:18	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 06:18	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 06:18	7439-92-1	
Zinc	**0.37**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 06:18	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0059**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 00:51	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 00:51	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 00:51	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 00:51	7439-92-1	
Zinc, Dissolved	**0.056**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 00:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:04	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**119**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.3**	mg/L	2.5	1.2	1		09/06/13 13:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0686-082813 **Lab ID: 10240702004** Collected: 08/30/13 08:51 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 06:40	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 06:40	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 06:40	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 06:40	7439-92-1	
Zinc	**0.70**	mg/L	0.025	0.0049	5	09/11/13 16:40	09/17/13 06:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0080**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 01:28	7440-38-2	
Cadmium, Dissolved	**0.00046**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 01:28	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 01:28	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 01:28	7439-92-1	
Zinc, Dissolved	**0.090**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 01:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00024**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:16	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**243**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.2**	mg/L	2.5	1.2	1		09/06/13 13:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0687-082813 **Lab ID: 10240702005** Collected: 08/30/13 08:54 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 06:51	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 06:51	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 06:51	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 06:51	7439-92-1	
Zinc	**0.74**	mg/L	0.025	0.0049	5	09/11/13 16:40	09/17/13 06:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0079**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 01:39	7440-38-2	
Cadmium, Dissolved	**0.00045**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 01:39	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 01:39	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 01:39	7439-92-1	
Zinc, Dissolved	**0.091**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 01:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00023**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:19	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00012J**	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:33	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**234**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.0**	mg/L	2.5	1.2	1		09/06/13 13:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0688-082813 **Lab ID: 10240702006** Collected: 08/30/13 08:57 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/18/13 09:36	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/18/13 09:36	7440-43-9	
Copper	**0.00020J**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/18/13 09:36	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/18/13 09:36	7439-92-1	
Zinc	**0.0020J**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/18/13 09:36	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 01:48	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 01:48	7440-43-9	
Copper, Dissolved	**0.00029J**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 01:48	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 01:48	7439-92-1	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 01:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:21	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:35	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/06/13 13:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0689-082813 **Lab ID: 10240702007** Collected: 08/30/13 08:59 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 18:26	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 18:26	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 18:26	7440-50-8	
Lead	**0.095**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 18:26	7439-92-1	
Zinc	**0.36**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 18:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0056**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 01:57	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 01:57	7440-43-9	
Copper, Dissolved	**0.058**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 01:57	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 01:57	7439-92-1	
Zinc, Dissolved	**0.056**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 01:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020J**	mg/L	0.00060	0.000090	1	09/14/13 09:58	09/16/13 16:24	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**148**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.1**	mg/L	2.5	1.2	1		09/06/13 13:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0690-082813 **Lab ID: 10240702008** Collected: 08/30/13 09:01 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 18:38	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 18:38	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 18:38	7440-50-8	
Lead	**0.12**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 18:38	7439-92-1	
Zinc	**0.39**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 18:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0062**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 02:07	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 02:07	7440-43-9	
Copper, Dissolved	**0.048**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 02:07	7440-50-8	
Lead, Dissolved	**0.0026**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 02:07	7439-92-1	
Zinc, Dissolved	**0.051**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 02:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00034**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:26	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**184**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.9**	mg/L	2.5	1.2	1		09/06/13 13:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0691-082813 **Lab ID: 10240702009** Collected: 08/30/13 09:03 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 18:50	7440-38-2	
Cadmium	**0.0038**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 18:50	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 18:50	7440-50-8	
Lead	**0.056**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 18:50	7439-92-1	
Zinc	**0.74**	mg/L	0.025	0.0049	5	09/11/13 16:40	09/17/13 18:56	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0099**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 02:33	7440-38-2	
Cadmium, Dissolved	**0.0023**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 02:33	7440-43-9	
Copper, Dissolved	**0.068**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 02:33	7440-50-8	
Lead, Dissolved	**0.00085**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 02:33	7439-92-1	
Zinc, Dissolved	**0.40**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 02:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00024**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:29	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**133**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**22.2**	mg/L	2.5	1.2	1		09/06/13 13:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0692-082813 **Lab ID: 10240702010** Collected: 08/30/13 09:09 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 19:02	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 19:02	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 19:02	7440-50-8	
Lead	**0.074**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 19:02	7439-92-1	
Zinc	**0.36**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 19:02	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0069**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 02:43	7440-38-2	
Cadmium, Dissolved	**0.00037**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 02:43	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 02:43	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 02:43	7439-92-1	
Zinc, Dissolved	**0.087**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 02:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:31	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**104**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.1**	mg/L	2.5	1.2	1		09/06/13 13:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0693-082813 **Lab ID: 10240702011** Collected: 08/30/13 09:12 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 19:38	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 19:38	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 19:38	7440-50-8	
Lead	**0.096**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 19:38	7439-92-1	
Zinc	**0.38**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 19:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0048**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 02:52	7440-38-2	
Cadmium, Dissolved	**0.00032**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 02:52	7440-43-9	
Copper, Dissolved	**0.033**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 02:52	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 02:52	7439-92-1	
Zinc, Dissolved	**0.091**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 02:52	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00017J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:33	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:55	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**96.8**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.4**	mg/L	2.5	1.2	1		09/06/13 13:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0694-082813 **Lab ID: 10240702012** Collected: 08/30/13 09:15 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 19:50	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 19:50	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 19:50	7440-50-8	
Lead	**0.11**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 19:50	7439-92-1	
Zinc	**0.44**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 19:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0053**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 03:07	7440-38-2	
Cadmium, Dissolved	**0.00036**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 03:07	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 03:07	7440-50-8	
Lead, Dissolved	**0.0079**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 03:07	7439-92-1	
Zinc, Dissolved	**0.097**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 03:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00016J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:41	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 14:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**85.0**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.5**	mg/L	2.5	1.2	1		09/06/13 13:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0695-082813 **Lab ID: 10240702013** Collected: 08/30/13 09:17 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 20:02	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 20:02	7440-43-9	
Calcium	**16.0**	mg/L	0.10	0.049	5	09/11/13 16:40	09/17/13 20:09	7440-70-2	
Copper	**0.16**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 20:02	7440-50-8	
Iron	**8.3**	mg/L	0.25	0.030	5	09/11/13 16:40	09/17/13 20:09	7439-89-6	
Lead	**0.16**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 20:02	7439-92-1	
Magnesium	**7.0**	mg/L	0.025	0.012	5	09/11/13 16:40	09/17/13 20:09	7439-95-4	
Manganese	**0.64**	mg/L	0.0025	0.00092	5	09/11/13 16:40	09/17/13 20:09	7439-96-5	
Potassium	**4.6**	mg/L	0.10	0.024	5	09/11/13 16:40	09/17/13 20:09	7440-09-7	
Silica	**45.0**	mg/L	0.27	0.13	5	09/11/13 16:40	09/17/13 20:09	7631-86-9	
Sodium	**4.1**	mg/L	0.25	0.051	5	09/11/13 16:40	09/17/13 20:09	7440-23-5	
Zinc	**0.63**	mg/L	0.025	0.0049	5	09/11/13 16:40	09/17/13 20:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0057**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 03:34	7440-38-2	
Cadmium, Dissolved	**0.00022**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 03:34	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 03:34	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 03:34	7439-92-1	
Zinc, Dissolved	**0.064**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 03:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00031**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:43	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:00	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**39.5**	mg/L	5.0	2.5	1		01/03/14 13:02		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**197**	mg/L	10.0	5.0	1		09/05/13 08:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.5**	Std. Units	0.10	0.050	1		01/03/14 09:58		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**0.87**	mg/L	0.10	0.050	1		01/03/14 12:14	14797-55-8	H1
Nitrogen, NO2 plus NO3	**0.87**	mg/L	0.10	0.050	1		01/03/14 12:14		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.4**	mg/L	2.5	1.2	1		09/06/13 13:42	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**8.3**	mg/L	2.0	1.0	1		01/02/14 14:18	16887-00-6	H3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0695-082813 **Lab ID: 10240702013** Collected: 08/30/13 09:17 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0696-082813 **Lab ID: 10240702014** Collected: 08/30/13 09:20 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.035**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 20:15	7440-38-2	
Cadmium	**0.0056**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 20:15	7440-43-9	
Copper	**0.34**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 20:15	7440-50-8	
Lead	**0.51**	mg/L	0.00050	0.00023	5	09/11/13 16:40	09/17/13 20:21	7439-92-1	
Zinc	**2.0**	mg/L	0.025	0.0049	5	09/11/13 16:40	09/17/13 20:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0062**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 03:45	7440-38-2	
Cadmium, Dissolved	**0.00066**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 03:45	7440-43-9	
Copper, Dissolved	**0.047**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 03:45	7440-50-8	
Lead, Dissolved	**0.0034**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 03:45	7439-92-1	
Zinc, Dissolved	**0.17**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 03:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00025**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:46	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**456**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.2**	mg/L	2.5	1.2	1		09/06/13 13:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0697-082813 **Lab ID: 10240702015** Collected: 08/30/13 09:22 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 20:27	7440-38-2	
Cadmium	**0.00053**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 20:27	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 20:27	7440-50-8	
Lead	**0.025**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 20:27	7439-92-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 20:27	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0086**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 03:54	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 03:54	7440-43-9	
Copper, Dissolved	**0.058**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 03:54	7440-50-8	
Lead, Dissolved	**0.0023**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 03:54	7439-92-1	
Zinc, Dissolved	**0.065**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 03:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:48	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:05	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**52.9**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.8**	mg/L	2.5	1.2	1		09/06/13 13:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0698-082813 **Lab ID: 10240702016** Collected: 08/30/13 09:26 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 20:57	7440-38-2	
Cadmium	**0.00058**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 20:57	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 20:57	7440-50-8	
Lead	**0.038**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 20:57	7439-92-1	
Zinc	**0.19**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 20:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0079**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 04:03	7440-38-2	
Cadmium, Dissolved	**0.00028**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 04:03	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 04:03	7440-50-8	
Lead, Dissolved	**0.0029**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 04:03	7439-92-1	
Zinc, Dissolved	**0.064**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 04:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00017J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:51	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**98.5**	mg/L	10.0	5.0	1		09/05/13 08:37		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.7**	mg/L	2.5	1.2	1		09/06/13 13:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0699-082813 **Lab ID: 10240702017** Collected: 08/30/13 09:29 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 21:09	7440-38-2	
Cadmium	**0.00072**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 21:09	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 21:09	7440-50-8	
Lead	**0.046**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 21:09	7439-92-1	
Zinc	**0.23**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 21:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0072**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 04:13	7440-38-2	
Cadmium, Dissolved	**0.00034**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 04:13	7440-43-9	
Copper, Dissolved	**0.049**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 04:13	7440-50-8	
Lead, Dissolved	**0.0034**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 04:13	7439-92-1	
Zinc, Dissolved	**0.071**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 04:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00021**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 16:53	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**99.4**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.2**	mg/L	2.5	1.2	1		09/06/13 13:44	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0700-082813 **Lab ID: 10240702018** Collected: 08/30/13 09:31 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0077**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 21:21	7440-38-2	
Cadmium	**0.00040**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 21:21	7440-43-9	
Copper	**0.089**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 21:21	7440-50-8	
Lead	**0.020**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 21:21	7439-92-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 21:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0047**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 04:39	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 04:39	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 04:39	7440-50-8	
Lead, Dissolved	**0.00069**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 04:39	7439-92-1	
Zinc, Dissolved	**0.047**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 04:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000074J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 17:00	7439-97-6	B,M1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**66.5**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.0**	mg/L	2.5	1.2	1		09/06/13 13:44	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0701-082813 **Lab ID: 10240702019** Collected: 08/30/13 09:34 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.027**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 21:33	7440-38-2	
Cadmium	**0.0053**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 21:33	7440-43-9	
Copper	**0.73**	mg/L	0.0025	0.00087	5	09/11/13 16:40	09/17/13 21:39	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 21:33	7439-92-1	
Zinc	**2.5**	mg/L	0.050	0.0098	10	09/11/13 16:40	09/18/13 09:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0031**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 04:48	7440-38-2	
Cadmium, Dissolved	**0.00043**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 04:48	7440-43-9	
Copper, Dissolved	**0.080**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 04:48	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 04:48	7439-92-1	
Zinc, Dissolved	**0.33**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 04:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00030**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 17:05	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:20	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**456**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**42.7**	mg/L	5.0	2.5	2		09/06/13 13:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0702-082813 **Lab ID: 10240702020** Collected: 08/30/13 09:40 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	09/11/13 16:40	09/17/13 21:45	7440-38-2	
Cadmium	**0.00052**	mg/L	0.000080	0.000032	1	09/11/13 16:40	09/17/13 21:45	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	09/11/13 16:40	09/17/13 21:45	7440-50-8	
Lead	**0.016**	mg/L	0.00010	0.000046	1	09/11/13 16:40	09/17/13 21:45	7439-92-1	
Zinc	**0.088**	mg/L	0.0050	0.00098	1	09/11/13 16:40	09/17/13 21:45	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	09/11/13 16:51	09/17/13 04:58	7440-38-2	
Cadmium, Dissolved	**0.00036**	mg/L	0.000080	0.000032	1	09/11/13 16:51	09/17/13 04:58	7440-43-9	
Copper, Dissolved	**0.052**	mg/L	0.00050	0.00017	1	09/11/13 16:51	09/17/13 04:58	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/11/13 16:51	09/17/13 04:58	7439-92-1	
Zinc, Dissolved	**0.038**	mg/L	0.0050	0.00098	1	09/11/13 16:51	09/17/13 04:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000047J**	mg/L	0.00020	0.000030	1	09/14/13 09:58	09/16/13 17:08	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/12/13 08:41	09/13/13 15:23	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**33.6**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**31.7**	mg/L	5.0	2.5	2		09/06/13 13:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0703-082813 **Lab ID: 10240702021** Collected: 08/30/13 09:42 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 14:12	7440-38-2	
Cadmium	**0.00073**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 14:12	7440-43-9	
Copper	**0.095**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 14:12	7440-50-8	
Lead	**0.023**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 14:12	7439-92-1	
Zinc	**0.12**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 14:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.015**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:09	7440-38-2	
Cadmium, Dissolved	**0.00050**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:09	7440-43-9	
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:09	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:09	7439-92-1	
Zinc, Dissolved	**0.051**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:09	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000083J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 12:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**58.3**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**30.9**	mg/L	5.0	2.5	2		09/06/13 14:39	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0704-082813 **Lab ID: 10240702022** Collected: 08/30/13 09:44 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Copper	**0.10**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 15:16	7440-50-8	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 15:16	7440-66-6	
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 15:16	7440-38-2	
Cadmium	**0.00068**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 15:16	7440-43-9	
Lead	**0.033**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 15:16	7439-92-1	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:12	7440-50-8	
Zinc, Dissolved	**0.069**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:12	7440-66-6	
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:12	7440-38-2	
Cadmium, Dissolved	**0.00037**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:12	7440-43-9	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:12	7439-92-1	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000087J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:03	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:50	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**65.2**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.4**	mg/L	2.5	1.2	1		09/06/13 14:22	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0705-082813 **Lab ID: 10240702023** Collected: 08/30/13 09:46 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 14:47	7440-38-2	
Cadmium	**0.00082**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 14:47	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 14:47	7440-50-8	
Lead	**0.067**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 14:47	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 14:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0063**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:18	7440-38-2	
Cadmium, Dissolved	**0.00033**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:18	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:18	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:18	7439-92-1	
Zinc, Dissolved	**0.079**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00037**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:11	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:57	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**115**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.7**	mg/L	2.5	1.2	1		09/06/13 14:22	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0706-082813 **Lab ID: 10240702024** Collected: 08/30/13 09:49 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 14:52	7440-38-2	
Cadmium	**0.00074**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 14:52	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 14:52	7440-50-8	
Lead	**0.058**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 14:52	7439-92-1	
Zinc	**0.25**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 14:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0099**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:21	7440-38-2	
Cadmium, Dissolved	**0.00034**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:21	7440-43-9	
Copper, Dissolved	**0.049**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:21	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:21	7439-92-1	
Zinc, Dissolved	**0.072**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00019J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:13	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000041J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:00	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**109**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.0**	mg/L	2.5	1.2	1		09/06/13 14:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0707-082813 **Lab ID: 10240702025** Collected: 08/30/13 09:51 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 14:57	7440-38-2	
Cadmium	**0.00074**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 14:57	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 14:57	7440-50-8	
Lead	**0.059**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 14:57	7439-92-1	
Zinc	**0.25**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 14:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:23	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:23	7440-43-9	
Copper, Dissolved	**0.049**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:23	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:23	7439-92-1	
Zinc, Dissolved	**0.071**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00017J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:16	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:02	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**116**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.3**	mg/L	2.5	1.2	1		09/06/13 14:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0708-082813 **Lab ID: 10240702026** Collected: 08/30/13 09:56 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 15:02	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 15:02	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 15:02	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 15:02	7439-92-1	
Zinc	**0.0017J**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 15:02	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:35	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:35	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:35	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:35	7439-92-1	
Zinc, Dissolved	**0.0015J**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:05	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**6.2J**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/06/13 14:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0709-082813 **Lab ID: 10240702027** Collected: 08/30/13 09:58 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 15:06	7440-38-2	
Cadmium	**0.0028**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 15:06	7440-43-9	
Copper	**0.36**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 15:06	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 15:06	7439-92-1	
Zinc	**0.65**	mg/L	0.025	0.0049	5	09/08/13 10:18	09/13/13 10:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.016**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:38	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:38	7440-43-9	
Copper, Dissolved	**0.0069**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:38	7440-50-8	
Lead, Dissolved	**0.0052**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:38	7439-92-1	
Zinc, Dissolved	**0.062**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00032**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**183**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.9**	mg/L	2.5	1.2	1		09/06/13 14:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0710-082813 **Lab ID: 10240702028** Collected: 08/30/13 11:32 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0099**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 15:11	7440-38-2	
Cadmium	**0.00045**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 15:11	7440-43-9	
Copper	**0.21**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 15:11	7440-50-8	
Lead	**0.023**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 15:11	7439-92-1	
Zinc	**0.15**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 15:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0052**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:40	7440-38-2	
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:40	7440-43-9	
Copper, Dissolved	**0.087**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:40	7440-50-8	
Lead, Dissolved	**0.00042**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:40	7439-92-1	
Zinc, Dissolved	**0.037**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:10	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**34.3**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.3**	mg/L	2.5	1.2	1		09/06/13 14:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Sample: SD0711-082813 **Lab ID: 10240702029** Collected: 08/30/13 11:35 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/08/13 10:18	09/12/13 15:44	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	09/08/13 10:18	09/12/13 15:44	7440-43-9	
Copper	**0.37**	mg/L	0.00050	0.00017	1	09/08/13 10:18	09/12/13 15:44	7440-50-8	
Lead	**0.050**	mg/L	0.00010	0.000046	1	09/08/13 10:18	09/12/13 15:44	7439-92-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	09/08/13 10:18	09/12/13 15:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0091**	mg/L	0.00050	0.000093	1	09/08/13 10:13	09/17/13 17:43	7440-38-2	
Cadmium, Dissolved	**0.00045**	mg/L	0.000080	0.000032	1	09/08/13 10:13	09/17/13 17:43	7440-43-9	
Copper, Dissolved	**0.12**	mg/L	0.00050	0.00017	1	09/08/13 10:13	09/17/13 17:43	7440-50-8	
Lead, Dissolved	**0.00041**	mg/L	0.00010	0.000046	1	09/08/13 10:13	09/17/13 17:43	7439-92-1	
Zinc, Dissolved	**0.062**	mg/L	0.0050	0.00098	1	09/08/13 10:13	09/17/13 17:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000079J**	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 13:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/10/13 10:45	09/11/13 14:12	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**96.1**	mg/L	10.0	5.0	1		09/05/13 08:57		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**31.3**	mg/L	5.0	2.5	2		09/06/13 14:39	14808-79-8	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MERP/9178 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

METHOD BLANK: 1516858 — Matrix: Water
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/11/13 12:51	

LABORATORY CONTROL SAMPLE: 1516859

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0045	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1516860 1516861

Parameter	Units	10240702021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00008 3J	.005	.005	0.0048	0.0049	95	97	85-115	2	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MERP/9239 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

METHOD BLANK: 1524383 Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000054J	0.00020	09/16/13 15:54	

LABORATORY CONTROL SAMPLE: 1524384

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0044	87	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524877 1524878

Parameter	Units	10240702003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00014 J	.005	.005	0.0051	0.0052	99	102	85-115	2	20	

MATRIX SPIKE SAMPLE: 1524879

Parameter	Units	10240702018 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000074J	.005	0.0059	117	85-115	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MERP/9175 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

METHOD BLANK: 1516840 — Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/13/13 14:08	

LABORATORY CONTROL SAMPLE: 1516841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0052	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1516842 1516843

Parameter	Units	10240702001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0054	0.0049	107	99	85-115	8	20	

MATRIX SPIKE SAMPLE: 1516844

Parameter	Units	10240702020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0051	102	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MERP/9177 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

METHOD BLANK: 1516853 Matrix: Water
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	0.000085J	0.00020	09/11/13 13:38	

LABORATORY CONTROL SAMPLE: 1516854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1516855 1516856

Parameter	Units	10240702021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0052	0.0052	103	104	85-115	.4	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MPRP/41668 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

METHOD BLANK: 1517081 Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/17/13 18:20	
Cadmium	mg/L	ND	0.000080	09/17/13 18:20	
Calcium	ug/L	ND	20.0	09/17/13 18:20	
Copper	mg/L	ND	0.00050	09/17/13 18:20	
Iron	ug/L	ND	50.0	09/17/13 18:20	
Lead	mg/L	ND	0.00010	09/17/13 18:20	
Magnesium	ug/L	ND	5.0	09/17/13 18:20	
Manganese	ug/L	ND	0.50	09/17/13 18:20	
Potassium	ug/L	6.8J	20.0	09/17/13 18:20	
Sodium	ug/L	25.0J	50.0	09/17/13 18:20	
Zinc	mg/L	0.0013J	0.0050	09/17/13 18:20	

LABORATORY CONTROL SAMPLE: 1517082

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.082	102	85-115	
Calcium	ug/L	1000	1020	102	85-115	
Copper	mg/L	.08	0.081	102	85-115	
Iron	ug/L	1000	1030	103	85-115	
Lead	mg/L	.08	0.080	100	85-115	
Magnesium	ug/L	1000	1040	104	85-115	
Manganese	ug/L	80	81.3	102	85-115	
Potassium	ug/L	1000	1010	101	85-115	
Sodium	ug/L	1000	1000	100	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE SAMPLE: 1517085

Parameter	Units	10240702011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.013	.08	0.094	102	70-130	
Cadmium	mg/L	0.0014	.08	0.085	104	70-130	
Calcium	ug/L	8160		12400			
Copper	mg/L	0.10	.08	0.19	113	70-130	
Iron	ug/L	72.2		5720			
Lead	mg/L	0.096	.08	0.19	113	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

MATRIX SPIKE SAMPLE: 1517085

Parameter	Units	10240702011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Magnesium	ug/L	2710		5670			
Manganese	ug/L	149		436			
Potassium	ug/L	2040		4580			
Sodium	ug/L	3240		4690			
Zinc	mg/L	0.38	.08	0.48	120	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1519525 1519526

Parameter	Units	10240702002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.012	.08	.08	0.095	0.094	104	102	70-130	2	20	
Cadmium	mg/L	0.00086	.08	.08	0.084	0.084	104	104	70-130	.6	20	
Calcium	ug/L	11600	1000	1000	13000	12900	139	130	70-130	.7	20	
Copper	mg/L	0.12	.08	.08	0.22	0.21	117	114	70-130	1	20	
Iron	ug/L	3500	1000	1000	4890	4780	139	128	70-130	2	20	
Lead	mg/L	0.082	.08	.08	0.19	0.19	135	132	70-130	1	20	M1
Magnesium	ug/L	3830	1000	1000	5080	5000	125	118	70-130	1	20	
Manganese	ug/L	199	80	80	291	287	116	111	70-130	1	20	
Potassium	ug/L	3350	1000	1000	4680	4600	133	125	70-130	2	20	
Sodium	ug/L	3280	1000	1000	4480	4430	120	114	70-130	1	20	
Zinc	mg/L	0.34	.08	.08	0.43	0.43	109	110	70-130	.2	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MPRP/41669 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

METHOD BLANK: 1517086 — Matrix: Water
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/12/13 11:57	
Cadmium	mg/L	ND	0.000080	09/12/13 11:57	
Copper	mg/L	ND	0.00050	09/12/13 11:57	
Lead	mg/L	ND	0.00010	09/12/13 11:57	
Zinc	mg/L	ND	0.0050	09/12/13 11:57	

LABORATORY CONTROL SAMPLE: 1517087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.083	103	85-115	
Copper	mg/L	.08	0.082	102	85-115	
Lead	mg/L	.08	0.082	103	85-115	
Zinc	mg/L	.08	0.083	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1517088 1517089

Parameter	Units	10240594001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	2.2 ug/L	.08	.08	0.082	0.082	100	100	70-130	.3	20	
Cadmium	mg/L	ND	.08	.08	0.083	0.082	104	103	70-130	1	20	
Copper	mg/L	1.1 ug/L	.08	.08	0.080	0.080	99	99	70-130	.2	20	
Lead	mg/L	0.088J ug/L	.08	.08	0.082	0.083	102	104	70-130	2	20	
Zinc	mg/L	4.2J ug/L	.08	.08	0.086	0.15	103	177	70-130	51	20	M1,R1

MATRIX SPIKE SAMPLE: 1517090

Parameter	Units	10240702022 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.015	.08	0.092	97	70-130	
Cadmium	mg/L	0.00068	.08	0.082	102	70-130	
Copper	mg/L	0.10	.08	0.18	99	70-130	
Lead	mg/L	0.033	.08	0.11	102	70-130	
Zinc	mg/L	0.18	.08	0.26	106	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MPRP/41665 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

METHOD BLANK: 1517067 — Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/17/13 00:26	
Cadmium, Dissolved	mg/L	ND	0.000080	09/17/13 00:26	
Copper, Dissolved	mg/L	ND	0.00050	09/17/13 00:26	
Lead, Dissolved	mg/L	ND	0.00010	09/17/13 00:26	
Zinc, Dissolved	mg/L	ND	0.0050	09/17/13 00:26	

LABORATORY CONTROL SAMPLE: 1517068

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.081	101	85-115	
Cadmium, Dissolved	mg/L	.08	0.082	102	85-115	
Copper, Dissolved	mg/L	.08	0.082	102	85-115	
Lead, Dissolved	mg/L	.08	0.085	106	85-115	
Zinc, Dissolved	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE SAMPLE: 1517071

Parameter	Units	10240702011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0048	.08	0.088	103	70-130	
Cadmium, Dissolved	mg/L	0.00032	.08	0.083	103	70-130	
Copper, Dissolved	mg/L	0.033	.08	0.12	111	70-130	
Lead, Dissolved	mg/L	0.0024	.08	0.10	123	70-130	
Zinc, Dissolved	mg/L	0.091	.08	0.17	99	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1519527 1519528

Parameter	Units	10240702002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0058	.08	.08	0.090	0.087	105	102	70-130	3	20	
Cadmium, Dissolved	mg/L	0.00027	.08	.08	0.084	0.082	105	103	70-130	2	20	
Copper, Dissolved	mg/L	0.046	.08	.08	0.14	0.13	115	109	70-130	3	20	
Lead, Dissolved	mg/L	0.0016	.08	.08	0.10	0.099	124	122	70-130	2	20	
Zinc, Dissolved	mg/L	0.067	.08	.08	0.15	0.17	101	131	70-130	15	20	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: MPRP/41666 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

METHOD BLANK: 1517072 — Matrix: Water
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/17/13 16:22	
Cadmium, Dissolved	mg/L	ND	0.000080	09/17/13 16:22	
Copper, Dissolved	mg/L	ND	0.00050	09/17/13 16:22	
Lead, Dissolved	mg/L	ND	0.00010	09/17/13 16:22	
Zinc, Dissolved	mg/L	ND	0.0050	09/17/13 16:22	

LABORATORY CONTROL SAMPLE: 1517073

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.084	106	85-115	
Cadmium, Dissolved	mg/L	.08	0.086	108	85-115	
Copper, Dissolved	mg/L	.08	0.083	104	85-115	
Lead, Dissolved	mg/L	.08	0.086	108	85-115	
Zinc, Dissolved	mg/L	.08	0.085	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1517074 — 1517075

Parameter	Units	10240594001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	2.2 ug/L	.08	.08	0.085	0.084	103	102	70-130	1	20	
Cadmium, Dissolved	mg/L	ND	.08	.08	0.085	0.086	106	107	70-130	1	20	
Copper, Dissolved	mg/L	0.76 ug/L	.08	.08	0.083	0.083	103	103	70-130	.1	20	
Lead, Dissolved	mg/L	ND	.08	.08	0.082	0.083	103	103	70-130	.8	20	
Zinc, Dissolved	mg/L	3.9J ug/L	.08	.08	0.088	0.098	105	117	70-130	11	20	

MATRIX SPIKE SAMPLE: 1517076

Parameter	Units	10240702022 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.012	.08	0.093	102	70-130	
Cadmium, Dissolved	mg/L	0.00037	.08	0.087	108	70-130	
Copper, Dissolved	mg/L	0.044	.08	0.13	104	70-130	
Lead, Dissolved	mg/L	0.0016	.08	0.082	101	70-130	
Zinc, Dissolved	mg/L	0.069	.08	0.15	106	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WET/33876 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10240702013

METHOD BLANK: 1604009 | Matrix: Water
Associated Lab Samples: 10240702013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WET/32110 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016

METHOD BLANK: 1517181 — Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/05/13 08:37	

METHOD BLANK: 1517185 — Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/05/13 08:37	

LABORATORY CONTROL SAMPLE: 1517182

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	105	105	80-120	

SAMPLE DUPLICATE: 1517183

Parameter	Units	10240522001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1517184

Parameter	Units	10240702016 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	98.5	93.7	5	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WET/32112 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10240702017, 10240702018, 10240702019, 10240702020, 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

METHOD BLANK: 1517215 — Matrix: Water
Associated Lab Samples: 10240702017, 10240702018, 10240702019, 10240702020, 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/05/13 08:57	

METHOD BLANK: 1517223 — Matrix: Water
Associated Lab Samples: 10240702017, 10240702018, 10240702019, 10240702020, 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/05/13 08:57	

LABORATORY CONTROL SAMPLE: 1517216

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	89.6	90	80-120	

SAMPLE DUPLICATE: 1517217

Parameter	Units	10240702017 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	99.4	101	1	10	

SAMPLE DUPLICATE: 1517218

Parameter	Units	10240662001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WET/33874
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 10240702013

LABORATORY CONTROL SAMPLE: 1603988

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	99	98-102	H6

SAMPLE DUPLICATE: 1603989

Parameter	Units	10240339042 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.5	6.5	.2	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WETA/17057
QC Batch Method: SM 4500-NO3 H
Analysis Method: SM 4500-NO3 H
Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10240702013

METHOD BLANK: 1604003
Matrix: Water
Associated Lab Samples: 10240702013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WETA/15983 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

METHOD BLANK: 1518397 — Matrix: Water
Associated Lab Samples: 10240702001, 10240702002, 10240702003, 10240702004, 10240702005, 10240702006, 10240702007, 10240702008, 10240702009, 10240702010, 10240702011, 10240702012, 10240702013, 10240702014, 10240702015, 10240702016, 10240702017, 10240702018, 10240702019, 10240702020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/06/13 13:32	

LABORATORY CONTROL SAMPLE: 1518398

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.9	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518399 — 1518400

Parameter	Units	10240702001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	11.2	20	20	28.3	28.3	86	85	80-120	.06	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518401 — 1518402

Parameter	Units	10240702011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	7.4	20	20	26.9	26.9	98	98	80-120	.07	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WETA/15984 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

METHOD BLANK: 1518489 — Matrix: Water
Associated Lab Samples: 10240702021, 10240702022, 10240702023, 10240702024, 10240702025, 10240702026, 10240702027, 10240702028, 10240702029

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/06/13 14:04	

LABORATORY CONTROL SAMPLE: 1518490

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.0	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518491 — 1518492

Parameter	Units	10240268021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	27.6	20	20	47.9	47.4	102	99	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1518493 — 1518494

Parameter	Units	10240268031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	36.3	20	20	56.6	56.4	101	101	80-120	.3	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WETA/17041
QC Batch Method: SM 4500-Cl E
Analysis Method: SM 4500-Cl E
Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10240702013

METHOD BLANK: 1603873
Matrix: Water
Associated Lab Samples: 10240702013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

QC Batch: WETA/17023
QC Batch Method: SM 4500-NO2 B
Analysis Method: SM 4500-NO2 B
Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10240702013

METHOD BLANK: 1603178
Matrix: Water
Associated Lab Samples: 10240702013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240702001	**SD0683-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702002	**SD0684-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702003	**SD0685-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702004	**SD0686-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702005	**SD0687-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702006	**SD0688-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702007	**SD0689-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702008	**SD0690-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702009	**SD0691-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702010	**SD0692-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702011	**SD0693-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702012	**SD0694-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702013	**SD0695-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702014	**SD0696-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702015	**SD0697-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702016	**SD0698-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702017	**SD0699-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702018	**SD0700-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702019	**SD0701-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702020	**SD0702-082813**	EPA 200.8	MPRP/41668	EPA 200.8	ICPM/17567
10240702021	**SD0703-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702022	**SD0704-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702023	**SD0705-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702024	**SD0706-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702025	**SD0707-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702026	**SD0708-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702027	**SD0709-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702028	**SD0710-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702029	**SD0711-082813**	EPA 200.8	MPRP/41669	EPA 200.8	ICPM/17545
10240702001	**SD0683-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702002	**SD0684-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702003	**SD0685-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702004	**SD0686-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702005	**SD0687-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702006	**SD0688-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702007	**SD0689-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702008	**SD0690-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702009	**SD0691-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702010	**SD0692-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702011	**SD0693-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702012	**SD0694-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702013	**SD0695-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702014	**SD0696-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702015	**SD0697-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702016	**SD0698-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702017	**SD0699-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702018	**SD0700-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702019	**SD0701-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240702020	**SD0702-082813**	EPA 200.8	MPRP/41665	EPA 200.8	ICPM/17564
10240702021	**SD0703-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702022	**SD0704-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702023	**SD0705-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702024	**SD0706-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702025	**SD0707-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702026	**SD0708-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702027	**SD0709-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702028	**SD0710-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702029	**SD0711-082813**	EPA 200.8	MPRP/41666	EPA 200.8	ICPM/17542
10240702001	**SD0683-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702002	**SD0684-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702003	**SD0685-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702004	**SD0686-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702005	**SD0687-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702006	**SD0688-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702007	**SD0689-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702008	**SD0690-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702009	**SD0691-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702010	**SD0692-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702011	**SD0693-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702012	**SD0694-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702013	**SD0695-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702014	**SD0696-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702015	**SD0697-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702016	**SD0698-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702017	**SD0699-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702018	**SD0700-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702019	**SD0701-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702020	**SD0702-082813**	EPA 245.1	MERP/9239	EPA 245.1	MERC/10544
10240702021	**SD0703-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702022	**SD0704-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702023	**SD0705-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702024	**SD0706-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702025	**SD0707-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702026	**SD0708-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702027	**SD0709-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702028	**SD0710-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702029	**SD0711-082813**	EPA 245.1	MERP/9178	EPA 245.1	MERC/10511
10240702001	**SD0683-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702002	**SD0684-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702003	**SD0685-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702004	**SD0686-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702005	**SD0687-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702006	**SD0688-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702007	**SD0689-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702008	**SD0690-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240702009	**SD0691-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702010	**SD0692-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702011	**SD0693-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702012	**SD0694-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702013	**SD0695-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702014	**SD0696-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702015	**SD0697-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702016	**SD0698-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702017	**SD0699-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702018	**SD0700-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702019	**SD0701-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702020	**SD0702-082813**	EPA 245.1	MERP/9175	EPA 245.1	MERC/10531
10240702021	**SD0703-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702022	**SD0704-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702023	**SD0705-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702024	**SD0706-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702025	**SD0707-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702026	**SD0708-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702027	**SD0709-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702028	**SD0710-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702029	**SD0711-082813**	EPA 245.1	MERP/9177	EPA 245.1	MERC/10512
10240702013	**SD0695-082813**	SM 2320B	WET/33876		
10240702001	**SD0683-082813**	SM 2540D	WET/32110		
10240702002	**SD0684-082813**	SM 2540D	WET/32110		
10240702003	**SD0685-082813**	SM 2540D	WET/32110		
10240702004	**SD0686-082813**	SM 2540D	WET/32110		
10240702005	**SD0687-082813**	SM 2540D	WET/32110		
10240702006	**SD0688-082813**	SM 2540D	WET/32110		
10240702007	**SD0689-082813**	SM 2540D	WET/32110		
10240702008	**SD0690-082813**	SM 2540D	WET/32110		
10240702009	**SD0691-082813**	SM 2540D	WET/32110		
10240702010	**SD0692-082813**	SM 2540D	WET/32110		
10240702011	**SD0693-082813**	SM 2540D	WET/32110		
10240702012	**SD0694-082813**	SM 2540D	WET/32110		
10240702013	**SD0695-082813**	SM 2540D	WET/32110		
10240702014	**SD0696-082813**	SM 2540D	WET/32110		
10240702015	**SD0697-082813**	SM 2540D	WET/32110		
10240702016	**SD0698-082813**	SM 2540D	WET/32110		
10240702017	**SD0699-082813**	SM 2540D	WET/32112		
10240702018	**SD0700-082813**	SM 2540D	WET/32112		
10240702019	**SD0701-082813**	SM 2540D	WET/32112		
10240702020	**SD0702-082813**	SM 2540D	WET/32112		
10240702021	**SD0703-082813**	SM 2540D	WET/32112		
10240702022	**SD0704-082813**	SM 2540D	WET/32112		
10240702023	**SD0705-082813**	SM 2540D	WET/32112		
10240702024	**SD0706-082813**	SM 2540D	WET/32112		
10240702025	**SD0707-082813**	SM 2540D	WET/32112		

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10240702

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240702026	**SD0708-082813**	SM 2540D	WET/32112		
10240702027	**SD0709-082813**	SM 2540D	WET/32112		
10240702028	**SD0710-082813**	SM 2540D	WET/32112		
10240702029	**SD0711-082813**	SM 2540D	WET/32112		
10240702013	**SD0695-082813**	SM 4500-H+B	WET/33874		
10240702013	**SD0695-082813**	SM 4500-NO3 H	WETA/17057		
10240702001	**SD0683-082813**	ASTM D516	WETA/15983		
10240702002	**SD0684-082813**	ASTM D516	WETA/15983		
10240702003	**SD0685-082813**	ASTM D516	WETA/15983		
10240702004	**SD0686-082813**	ASTM D516	WETA/15983		
10240702005	**SD0687-082813**	ASTM D516	WETA/15983		
10240702006	**SD0688-082813**	ASTM D516	WETA/15983		
10240702007	**SD0689-082813**	ASTM D516	WETA/15983		
10240702008	**SD0690-082813**	ASTM D516	WETA/15983		
10240702009	**SD0691-082813**	ASTM D516	WETA/15983		
10240702010	**SD0692-082813**	ASTM D516	WETA/15983		
10240702011	**SD0693-082813**	ASTM D516	WETA/15983		
10240702012	**SD0694-082813**	ASTM D516	WETA/15983		
10240702013	**SD0695-082813**	ASTM D516	WETA/15983		
10240702014	**SD0696-082813**	ASTM D516	WETA/15983		
10240702015	**SD0697-082813**	ASTM D516	WETA/15983		
10240702016	**SD0698-082813**	ASTM D516	WETA/15983		
10240702017	**SD0699-082813**	ASTM D516	WETA/15983		
10240702018	**SD0700-082813**	ASTM D516	WETA/15983		
10240702019	**SD0701-082813**	ASTM D516	WETA/15983		
10240702020	**SD0702-082813**	ASTM D516	WETA/15983		
10240702021	**SD0703-082813**	ASTM D516	WETA/15984		
10240702022	**SD0704-082813**	ASTM D516	WETA/15984		
10240702023	**SD0705-082813**	ASTM D516	WETA/15984		
10240702024	**SD0706-082813**	ASTM D516	WETA/15984		
10240702025	**SD0707-082813**	ASTM D516	WETA/15984		
10240702026	**SD0708-082813**	ASTM D516	WETA/15984		
10240702027	**SD0709-082813**	ASTM D516	WETA/15984		
10240702028	**SD0710-082813**	ASTM D516	WETA/15984		
10240702029	**SD0711-082813**	ASTM D516	WETA/15984		
10240702013	**SD0695-082813**	SM 4500-Cl E	WETA/17041		
10240702013	**SD0695-082813**	SM 4500-NO2 B	WETA/17023		

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11 32-1135

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10240702

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar	Lindy Hanson		
BP PM Phone:	723-1838		
BP PM Email:	lindy.hansont@bp.com		

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4							Comments
	SD0683-082813	8/30/2013	8:34		x			3	1		2				x	x	x							10240702001
	SD0684-082813	8/30/2013	8:44		x			3	1		2				x	x	x							002
	SD0685-082813	8/30/2013	8:48		x			3	1		2				x	x	x							003
	SD0686-082813	8/30/2013	8:51		x			3	1		2				x	x	x							004
	SD0687-082813	8/30/2013	8:54		x			3	1		2				x	x	x							005
	SD0688-082813	8/30/2013	8:57		x			3	1		2				x	x	x							006
	SD0689-082813	8/30/2013	8:59		x			3	1		2				x	x	x							007
	SD0690-082813	8/30/2013	9:01		x			3	1		2				x	x	x							008
	SD0691-082813	8/30/2013	9:03		x			3	1		2				x	x	x							009
	SD0692-082813	8/30/2013	9:09		x			3	1		2				x	x	x							010

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Jacqueline Janosko								
Sampler's Company:	TREC, INC.			TREC	09/03/13	1010		9.4.13	9:50
Shipment Method:	Fed Ex	Ship Date:	9/3/2013						
Shipment Tracking No:	8006 6032 3529								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.3, 2.8 F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

0.9

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10240702

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0693-082813	8/30/2013	9:12		x			3	1		2				x	x	x								10240702011
	SD0694-082813	8/30/2013	9:15		x			3	1		2				x	x	x								012
	SD0695-082813	8/30/2013	9:17		x			3	1		2				x	x	x								013
	SD0696-082813	8/30/2013	9:20		x			3	1		2				x	x	x								014
	SD0697-082813	8/30/2013	9:22		x			3	1		2				x	x	x								015
	SD0698-082813	8/30/2013	9:26		x			3	1		2				x	x	x								016
	SD0699-082813	8/30/2013	9:29		x			3	1		2				x	x	x								017
	SD0700-082813	8/30/2013	9:31		x			3	1		2				x	x	x								018
	SD0701-082813	8/30/2013	9:34		x			3	1		2				x	x	x								019
	SD0702-082813	8/30/2013	9:40		x			3	1		2				x	x	x								020

		Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Jacqueline Janosko						
Sampler's Company:	TREC, INC.	TREC	09/03/13	1010	Pace	9.4.13	9:50
Shipment Method:	Fed Ex Ship Date: 9/3/2013						
Shipment Tracking No:	8006 6032 3529						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.5, 2.8 °F/C 0.9 | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy):
Rush TAT: Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10240702

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar	Lindy Hanson		
BP PM Phone:	723-1838		
BP PM Email:	lindy.hansont@bp.com		

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0703-082813	8/30/2013	9:42		x			3	1		2				x	x	x								10240702021
	SD0704-082813	8/30/2013	9:44		x			3	1		2				x	x	x								022
	SD0705-082813	8/30/2013	9:46		x			3	1		2				x	x	x								023
	SD0706-082813	8/30/2013	9:49		x			3	1		2				x	x	x								024
	SD0707-082813	8/30/2013	9:51		x			3	1		2				x	x	x								025
	SD0708-082813	8/30/2013	9:56		x			3	1		2				x	x	x								026
	SD0709-082813	8/30/2013	9:58		x			3	1		2				x	x	x								027
	SD0710-082813	8/30/2013	11:32		x			3	1		2				x	x	x								028
	SD0711-082813	8/30/2013	11:35		x			3	1		2				x	x	x								029

Sampler's Name:	Jacqueline Janosko	**Relinquished By / Affiliation**	**Date**	**Time**	**Accepted By / Affiliation**	**Date**	**Time**
Sampler's Company:	TREC INC	[signature] TREC	09/03/13	1010	[signature] Pace	9.4.13	9:50
Shipment Method:	Fed Ex Ship Date: 9/3/2013						
Shipment Tracking No:	8006 6032 3529						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 25.28 °F/C 0.9 | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP TREC Inc

Project #: WO#: 10240702

10240702

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: SCUR Exception Form

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 20.23.0.4 **Cooler Temp Corrected (°C):** 2.5, 2.8, 0.4 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.5 **Date and Initials of Person Examining Contents:** CW 9-4-13

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1-29 2/2
Per method, VOA pH is checked after analysis				Initial when completed: CW Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 10:15	Temp: 20.23 0.4	Corrected Temp: 2.5, 2.8, 0.4	
Time: 10:35	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: LCA **Date:** 9/5/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical®	Document Name: **SCUR Exceptions Form**	Document Revised: 16Apr2012 Page 1 of 1
	Document No.: **F-MN-L-220-Rev.00**	Issuing Authority: Pace Minnesota Quality Office

Workorder #: 16240702

Issue	Sample ID	Container Type/#
8476 2749 5791 (2.5)		
8476 2749 5806 (2.8)		
8006 6032 3529 (0.9)		

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

September 18, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10240734

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 04, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc.
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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10240734

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10240734

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10240734001	**LAO-SS-1-082913**	Water	08/29/13 15:15	09/04/13 09:50
10240734002	**LAO-SS-1-090213**	Water	09/02/13 09:20	09/04/13 09:50
10240734003	**LAO-SS-2-090213**	Water	09/02/13 09:00	09/04/13 09:50

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10240734

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10240734001	**LAO-SS-1-082913**	EPA 200.8	RB1, TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240734002	**LAO-SS-1-090213**	EPA 200.8	RB1, TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240734003	**LAO-SS-2-090213**	EPA 200.8	RB1, TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10240734

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 18, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41671

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240734003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1524183)
  - Calcium
  - Copper
  - Magnesium
  - Silver
  - Zinc
- MSD (Lab ID: 1524184)
  - Calcium
  - Silver
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10240734

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 18, 2013

Analyte Comments:

QC Batch: MPRP/41671

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1524183)
  - Calcium
  - Zinc
- MSD (Lab ID: 1524184)
  - Calcium
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10240734

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 18, 2013

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10240734

Sample: LAO-SS-1-082913 **Lab ID: 10240734001** Collected: 08/29/13 15:15 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.065**	mg/L	0.0040	0.0015	1	09/13/13 12:34	09/16/13 16:04	7429-90-5	
Arsenic	**0.0089**	mg/L	0.00050	0.000093	1	09/13/13 12:34	09/18/13 09:52	7440-38-2	
Cadmium	**0.00028**	mg/L	0.000080	0.000032	1	09/13/13 12:34	09/16/13 16:04	7440-43-9	
Calcium	**131**	mg/L	0.20	0.098	10	09/13/13 12:34	09/18/13 10:03	7440-70-2	
Copper	**0.018**	mg/L	0.00050	0.00017	1	09/13/13 12:34	09/16/13 16:04	7440-50-8	
Iron	**0.11**	mg/L	0.050	0.0059	1	09/13/13 12:34	09/16/13 16:04	7439-89-6	
Lead	**0.0015**	mg/L	0.00010	0.000046	1	09/13/13 12:34	09/16/13 16:04	7439-92-1	
Magnesium	**27.1**	mg/L	0.025	0.012	5	09/13/13 12:34	09/18/13 09:58	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	09/13/13 12:34	09/16/13 16:04	7440-22-4	
Total Hardness by 2340B	**439**	mg/L	0.71	0.36	10	09/13/13 12:34	09/18/13 10:03		
Uranium-238	**0.0015**	mg/L	0.00050	0.00010	1	09/13/13 12:34	09/16/13 16:04	7440-61-1	
Zinc	**0.064**	mg/L	0.0050	0.00098	1	09/13/13 12:34	09/18/13 09:52	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/14/13 08:36	09/16/13 10:42	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10240734

Sample: LAO-SS-1-090213 **Lab ID: 10240734002** Collected: 09/02/13 09:20 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.033**	mg/L	0.0040	0.0015	1	09/13/13 12:34	09/16/13 16:14	7429-90-5	
Arsenic	**0.0082**	mg/L	0.00050	0.000093	1	09/13/13 12:34	09/18/13 10:38	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000032	1	09/13/13 12:34	09/16/13 16:14	7440-43-9	
Calcium	**132**	mg/L	0.20	0.098	10	09/13/13 12:34	09/18/13 10:43	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	09/13/13 12:34	09/16/13 16:14	7440-50-8	
Iron	**0.063**	mg/L	0.050	0.0059	1	09/13/13 12:34	09/16/13 16:14	7439-89-6	
Lead	**0.0011**	mg/L	0.00010	0.000046	1	09/13/13 12:34	09/16/13 16:14	7439-92-1	
Magnesium	**26.7**	mg/L	0.025	0.012	5	09/13/13 12:34	09/16/13 16:18	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	09/13/13 12:34	09/16/13 16:14	7440-22-4	
Total Hardness by 2340B	**439**	mg/L	0.71	0.36	10	09/13/13 12:34	09/18/13 10:43		
Uranium-238	**0.0015**	mg/L	0.00050	0.00010	1	09/13/13 12:34	09/16/13 16:14	7440-61-1	
Zinc	**0.051**	mg/L	0.0050	0.00098	1	09/13/13 12:34	09/18/13 10:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/14/13 08:36	09/16/13 10:44	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10240734

Sample: LAO-SS-2-090213 **Lab ID: 10240734003** Collected: 09/02/13 09:00 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.096**	mg/L	0.0040	0.0015	1	09/13/13 12:34	09/16/13 16:23	7429-90-5	
Arsenic	**0.033**	mg/L	0.00050	0.000093	1	09/13/13 12:34	09/18/13 10:49	7440-38-2	
Cadmium	**0.023**	mg/L	0.000080	0.000032	1	09/13/13 12:34	09/16/13 16:23	7440-43-9	
Calcium	**140**	mg/L	0.20	0.098	10	09/13/13 12:34	09/18/13 10:54	7440-70-2	M1
Copper	**0.50**	mg/L	0.0025	0.00087	5	09/13/13 12:34	09/16/13 16:28	7440-50-8	M1
Iron	**2.7**	mg/L	0.050	0.0059	1	09/13/13 12:34	09/16/13 16:23	7439-89-6	
Lead	**0.0020**	mg/L	0.00010	0.000046	1	09/13/13 12:34	09/16/13 16:23	7439-92-1	
Magnesium	**32.0**	mg/L	0.025	0.012	5	09/13/13 12:34	09/16/13 16:28	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	09/13/13 12:34	09/16/13 16:23	7440-22-4	M1
Total Hardness by 2340B	**481**	mg/L	0.71	0.36	10	09/13/13 12:34	09/18/13 10:54		
Uranium-238	**0.0098**	mg/L	0.00050	0.00010	1	09/13/13 12:34	09/16/13 16:23	7440-61-1	
Zinc	**5.8**	mg/L	0.10	0.020	20	09/13/13 12:34	09/18/13 12:27	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/14/13 08:36	09/16/13 10:47	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10240734

QC Batch: MERP/9241 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240734001, 10240734002, 10240734003

METHOD BLANK: 1524620 Matrix: Water
Associated Lab Samples: 10240734001, 10240734002, 10240734003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/16/13 10:37	

LABORATORY CONTROL SAMPLE: 1524621

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524882 1524883

Parameter	Units	10240736022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0048	99	96	85-115	3	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10240734

QC Batch: MPRP/41671 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10240734001, 10240734002, 10240734003

METHOD BLANK: 1517096 Matrix: Water
Associated Lab Samples: 10240734001, 10240734002, 10240734003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0024J	0.0040	09/16/13 15:59	
Arsenic	mg/L	ND	0.00050	09/18/13 10:33	
Cadmium	mg/L	ND	0.000080	09/16/13 15:59	
Calcium	mg/L	ND	0.020	09/16/13 15:59	
Copper	mg/L	ND	0.00050	09/16/13 15:59	
Iron	mg/L	ND	0.050	09/16/13 15:59	
Lead	mg/L	ND	0.00010	09/16/13 15:59	
Magnesium	mg/L	0.0031J	0.0050	09/16/13 15:59	
Silver	mg/L	0.000069J	0.00050	09/16/13 15:59	
Uranium-238	mg/L	ND	0.00050	09/16/13 15:59	
Zinc	mg/L	ND	0.0050	09/18/13 10:33	

LABORATORY CONTROL SAMPLE: 1517097

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.078	98	85-115	
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Calcium	mg/L	1	1.0	103	85-115	
Copper	mg/L	.08	0.081	102	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.082	102	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.079	99	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.085	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524183 1524184

Parameter	Units	10240734003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.096	.08	.08	0.18	0.19	106	119	70-130	6	20	
Arsenic	mg/L	0.033	.08	.08	0.12	0.12	107	110	70-130	2	20	
Cadmium	mg/L	0.023	.08	.08	0.10	0.10	96	101	70-130	4	20	
Calcium	mg/L	140	1	1	125	124	-1460	-1540	70-130	.6	20	E,M1
Copper	mg/L	0.50	.08	.08	0.56	0.57	68	88	70-130	3	20	M1
Iron	mg/L	2.7	1	1	3.6	3.8	91	109	70-130	5	20	
Lead	mg/L	0.0020	.08	.08	0.075	0.077	91	94	70-130	3	20	
Magnesium	mg/L	32.0	1	1	31.1	33.0	-94	98	70-130	6	20	M1
Silver	mg/L	ND	.08	.08	0.024	0.028	30	35	70-130	16	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10240734

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524183 1524184

Parameter	Units	10240734003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0098	.08	.08	0.087	0.089	97	99	70-130	2	20	
Zinc	mg/L	5.8	.08	.08	6.0	6.1	335	452	70-130	2	20	E,M1

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10240734

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10240734

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240734001	**LAO-SS-1-082913**	EPA 200.8	MPRP/41671	EPA 200.8	ICPM/17544
10240734002	**LAO-SS-1-090213**	EPA 200.8	MPRP/41671	EPA 200.8	ICPM/17544
10240734003	**LAO-SS-2-090213**	EPA 200.8	MPRP/41671	EPA 200.8	ICPM/17544
10240734001	**LAO-SS-1-082913**	EPA 245.1	MERP/9241	EPA 245.1	MERC/10545
10240734002	**LAO-SS-1-090213**	EPA 245.1	MERP/9241	EPA 245.1	MERC/10545
10240734003	**LAO-SS-2-090213**	EPA 245.1	MERP/9241	EPA 245.1	MERC/10545

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1160

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10240734

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-082913	8/29/13	15:15		X						2			X			X	10240734001
	LAO-SS-1-090213	9/2/13	9:20		X						2			X			X	002
	LAO-SS-2-090213	9/2/13	9:00		X						1			X				003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: ~~Thomas~~ G Kissell & Steve Lubich						
Sampler's Company: Pioneer Technical Services	PTS	9/3/13	11:30	PACE	9-4-13	930
Shipment Method: Fed Ex Ship Date: 9/3/13						
Shipment Tracking No: 5 5409197 7302						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Technical

Project #: WO#: 10240734

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9197 7302

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.4 **Cooler Temp Corrected (°C):** 1.9 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.5 **Date and Initials of Person Examining Contents:** 9-4-13/MT

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 3 4/1
Per method, VOA pH is checked after analysis				Initial when completed: MT Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 1210 Temp: 1.9	Corrected Temp:
Time: 9/13 ~~1240~~ 1230 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 9/5/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

December 30, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 04, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 12/30/13 to add addition elements per the clients request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 5 #WD-15J
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10240736001	**LAO-BS-1-090313**	Water	09/03/13 10:30	09/04/13 09:50
10240736002	**LAO-BS-2-090313**	Water	09/03/13 10:32	09/04/13 09:50
10240736003	**LAO-BS-3-090313**	Water	09/03/13 10:34	09/04/13 09:50
10240736004	**LAO-BS-4-090313**	Water	09/03/13 10:36	09/04/13 09:50
10240736005	**LAO-BS-5-090313**	Water	09/03/13 10:38	09/04/13 09:50
10240736006	**LAO-BS-6-090313**	Water	09/03/13 10:40	09/04/13 09:50
10240736007	**LAO-BS-7-090313**	Water	09/03/13 10:42	09/04/13 09:50
10240736008	**LAO-BS-8-090313**	Water	09/03/13 10:44	09/04/13 09:50
10240736009	**LAO-BS-9-090313**	Water	09/03/13 10:46	09/04/13 09:50
10240736010	**LAO-BS-10-090313**	Water	09/03/13 10:48	09/04/13 09:50
10240736011	**LAO-BS-11-090313**	Water	09/03/13 10:50	09/04/13 09:50
10240736012	**LAO-BS-12-090313**	Water	09/03/13 10:52	09/04/13 09:50
10240736013	**LAO-BS-13-090313**	Water	09/03/13 10:56	09/04/13 09:50
10240736014	**LAO-BS-14-090313**	Water	09/03/13 10:58	09/04/13 09:50
10240736015	**LAO-BS-15-090313**	Water	09/03/13 11:00	09/04/13 09:50
10240736016	**LAO-BS-16-090313**	Water	09/03/13 11:02	09/04/13 09:50
10240736017	**LAO-BS-17-090313**	Water	09/03/13 11:04	09/04/13 09:50
10240736018	**LAO-BS-18-090313**	Water	09/03/13 11:06	09/04/13 09:50
10240736019	**LAO-BS-19-090313**	Water	09/03/13 11:08	09/04/13 09:50
10240736020	**LAO-BS-20-090313**	Water	09/03/13 11:10	09/04/13 09:50
10240736021	**LAO-BS-21-090313**	Water	09/03/13 11:12	09/04/13 09:50
10240736022	**LAO-BS-22-090313**	Water	09/03/13 11:14	09/04/13 09:50

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10240736001	**LAO-BS-1-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736002	**LAO-BS-2-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736003	**LAO-BS-3-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736004	**LAO-BS-4-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736005	**LAO-BS-5-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736006	**LAO-BS-6-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736007	**LAO-BS-7-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736008	**LAO-BS-8-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736009	**LAO-BS-9-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736010	**LAO-BS-10-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736011	**LAO-BS-11-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736012	**LAO-BS-12-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736013	**LAO-BS-13-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736014	**LAO-BS-14-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736015	**LAO-BS-15-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736016	**LAO-BS-16-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736017	**LAO-BS-17-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736018	**LAO-BS-18-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736019	**LAO-BS-19-090313**	EPA 200.8	TT3	16	PASI-M

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 245.1	WBS	1	PASI-M
10240736020	**LAO-BS-20-090313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736021	**LAO-BS-21-090313**	EPA 200.8	RB1, TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10240736022	**LAO-BS-22-090313**	EPA 200.8	RB1, TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

General Information:
22 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41670

B: Analyte was detected in the associated method blank.

- BLANK for HBN 266826 [MPRP/416 (Lab ID: 1517091)
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41670

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240736001,10240736011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1517093)
  - Calcium
  - Magnesium
  - Silver
  - Sodium
- MS (Lab ID: 1517095)
  - Calcium
  - Silver
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

QC Batch: MPRP/41670

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240736001,10240736011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1517094)
  - Calcium
  - Magnesium
  - Silver
  - Sodium

QC Batch: MPRP/41671

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240734003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1524183)
  - Calcium
  - Copper
  - Magnesium
  - Manganese
  - Potassium
  - Silver
  - Sodium
  - Zinc
- MSD (Lab ID: 1524184)
  - Calcium
  - Manganese
  - Potassium
  - Silver
  - Sodium
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41670

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1517093)
  - Calcium
  - Sodium
- MS (Lab ID: 1517095)
  - Calcium
  - Sodium
- MSD (Lab ID: 1517094)
  - Calcium
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

Analyte Comments:

QC Batch: MPRP/41671

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1524183)
  - Calcium
  - Manganese
  - Sodium
  - Zinc
- MSD (Lab ID: 1524184)
  - Calcium
  - Manganese
  - Sodium
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 30, 2013

General Information:
22 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-1-090313 **Lab ID: 10240736001** Collected: 09/03/13 10:30 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0057**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 15:29	7429-90-5	
Arsenic	**0.0026**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 15:29	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 15:29	7440-43-9	
Calcium	**98.5**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 15:34	7440-70-2	M1
Copper	**0.022**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 15:29	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 15:29	7439-89-6	
Lead	**0.00038**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 15:29	7439-92-1	
Magnesium	**25.0**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 15:34	7439-95-4	M1
Manganese	**0.69**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 15:34	7439-96-5	
Potassium	**8.1**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 15:29	7440-09-7	
Silica	**19.7**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 15:34	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 15:29	7440-22-4	M1
Sodium	**45.1**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 15:34	7440-23-5	M1
Total Hardness by 2340B	**349**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 15:34		
Uranium-238	**0.0036**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 15:29	7440-61-1	
Zinc	**0.37**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 15:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:20	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-2-090313 **Lab ID: 10240736002** Collected: 09/03/13 10:32 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.019**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 15:51	7429-90-5	
Arsenic	**0.0028**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 15:51	7440-38-2	
Cadmium	**0.0023**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 15:51	7440-43-9	
Calcium	**98.8**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 15:56	7440-70-2	
Copper	**0.026**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 15:51	7440-50-8	
Iron	**0.048J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 15:51	7439-89-6	
Lead	**0.00099**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 15:51	7439-92-1	
Magnesium	**25.5**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 15:56	7439-95-4	
Manganese	**0.74**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 15:56	7439-96-5	
Potassium	**8.1**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 15:51	7440-09-7	
Silica	**19.5**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 15:56	7631-86-9	
Silver	**0.00032J**	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 15:51	7440-22-4	B
Sodium	**45.1**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 15:56	7440-23-5	
Total Hardness by 2340B	**352**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 15:56		
Uranium-238	**0.0039**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 15:51	7440-61-1	
Zinc	**0.49**	mg/L	0.025	0.0049	5	09/09/13 08:20	09/11/13 15:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00033**	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:23	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-3-090313 **Lab ID: 10240736003** Collected: 09/03/13 10:34 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0030J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 16:01	7429-90-5	
Arsenic	**0.0021**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 16:01	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 16:01	7440-43-9	
Calcium	**102**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 16:06	7440-70-2	
Copper	**0.017**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 16:01	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 16:01	7439-89-6	
Lead	**0.00024**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 16:01	7439-92-1	
Magnesium	**26.6**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 16:06	7439-95-4	
Manganese	**0.69**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 16:06	7439-96-5	
Potassium	**8.4**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 16:01	7440-09-7	
Silica	**19.3**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 16:06	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 16:01	7440-22-4	
Sodium	**47.9**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 16:06	7440-23-5	
Total Hardness by 2340B	**364**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 16:06		
Uranium-238	**0.0027**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 16:01	7440-61-1	
Zinc	**0.38**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 16:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:30	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-4-090313 **Lab ID: 10240736004** Collected: 09/03/13 10:36 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.025**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 16:29	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 16:29	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 16:29	7440-43-9	
Calcium	**105**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 16:34	7440-70-2	
Copper	**0.016**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 16:29	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 16:29	7439-89-6	
Lead	**0.00024**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 16:29	7439-92-1	
Magnesium	**27.1**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 16:34	7439-95-4	
Manganese	**0.66**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 16:34	7439-96-5	
Potassium	**8.5**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 16:29	7440-09-7	
Silica	**19.8**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 16:34	7631-86-9	
Silver	**0.000053J**	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 16:29	7440-22-4	B
Sodium	**49.0**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 16:34	7440-23-5	
Total Hardness by 2340B	**373**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 16:34		
Uranium-238	**0.0024**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 16:29	7440-61-1	
Zinc	**0.30**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 16:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:37	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-5-090313 **Lab ID: 10240736005** Collected: 09/03/13 10:38 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 16:39	7429-90-5	
Arsenic	**0.0018**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 16:39	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 16:39	7440-43-9	
Calcium	**106**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 16:44	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 16:39	7440-50-8	
Iron	**0.024J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 16:39	7439-89-6	
Lead	**0.000061J**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 16:39	7439-92-1	
Magnesium	**28.0**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 16:44	7439-95-4	
Manganese	**0.62**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 16:44	7439-96-5	
Potassium	**8.6**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 16:39	7440-09-7	
Silica	**19.5**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 16:44	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 16:39	7440-22-4	
Sodium	**51.0**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 16:44	7440-23-5	
Total Hardness by 2340B	**380**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 16:44		
Uranium-238	**0.0018**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 16:39	7440-61-1	
Zinc	**0.33**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 16:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:40	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-6-090313 **Lab ID: 10240736006** Collected: 09/03/13 10:40 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0027J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 16:49	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 16:49	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 16:49	7440-43-9	
Calcium	**106**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 16:54	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 16:49	7440-50-8	
Iron	**0.019J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 16:49	7439-89-6	
Lead	**0.000056J**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 16:49	7439-92-1	
Magnesium	**27.5**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 16:54	7439-95-4	
Manganese	**0.57**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 16:54	7439-96-5	
Potassium	**8.6**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 16:49	7440-09-7	
Silica	**19.0**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 16:54	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 16:49	7440-22-4	
Sodium	**50.4**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 16:54	7440-23-5	
Total Hardness by 2340B	**378**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 16:54		
Uranium-238	**0.0017**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 16:49	7440-61-1	
Zinc	**0.23**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 16:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:42	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-7-090313 **Lab ID: 10240736007** Collected: 09/03/13 10:42 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.015**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 16:59	7429-90-5	
Arsenic	**0.00012J**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 16:59	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 16:59	7440-43-9	
Calcium	**23.7**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 17:04	7440-70-2	
Copper	**0.00068**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 16:59	7440-50-8	
Iron	**0.0066J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 16:59	7439-89-6	
Lead	**0.00040**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 16:59	7439-92-1	
Magnesium	**0.78**	mg/L	0.0050	0.0024	1	09/09/13 08:20	09/11/13 16:59	7439-95-4	
Manganese	**0.0031**	mg/L	0.00050	0.00018	1	09/09/13 08:20	09/11/13 16:59	7439-96-5	
Potassium	**0.98**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 16:59	7440-09-7	
Silica	**5.2**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 17:04	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 16:59	7440-22-4	
Sodium	**5.7**	mg/L	0.050	0.010	1	09/09/13 08:20	09/11/13 16:59	7440-23-5	
Total Hardness by 2340B	**62.4**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 17:04		
Uranium-238	ND	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 16:59	7440-61-1	
Zinc	**0.0038J**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 16:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000073J**	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:45	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-8-090313 **Lab ID: 10240736008** Collected: 09/03/13 10:44 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.018**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 17:10	7429-90-5	
Arsenic	**0.00014J**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 17:10	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 17:10	7440-43-9	
Calcium	**24.2**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 17:15	7440-70-2	
Copper	**0.00059**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 17:10	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 17:10	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 17:10	7439-92-1	
Magnesium	**0.40**	mg/L	0.0050	0.0024	1	09/09/13 08:20	09/11/13 17:10	7439-95-4	
Manganese	**0.0020**	mg/L	0.00050	0.00018	1	09/09/13 08:20	09/11/13 17:10	7439-96-5	
Potassium	**0.96**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 17:10	7440-09-7	
Silica	**5.5**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 17:15	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 17:10	7440-22-4	
Sodium	**5.6**	mg/L	0.050	0.010	1	09/09/13 08:20	09/11/13 17:10	7440-23-5	
Total Hardness by 2340B	**62.1**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 17:15		
Uranium-238	ND	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 17:10	7440-61-1	
Zinc	**0.0026J**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 17:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:47	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-9-090313 **Lab ID: 10240736009** Collected: 09/03/13 10:46 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0061**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 17:37	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 17:37	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 17:37	7440-43-9	
Calcium	**99.0**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 17:42	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 17:37	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 17:37	7439-89-6	
Lead	**0.00025**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 17:37	7439-92-1	
Magnesium	**25.8**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 17:42	7439-95-4	
Manganese	**0.41**	mg/L	0.00050	0.00018	1	09/09/13 08:20	09/11/13 17:37	7439-96-5	
Potassium	**8.3**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 17:37	7440-09-7	
Silica	**19.6**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 17:42	7631-86-9	
Silver	**0.000073J**	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 17:37	7440-22-4	B
Sodium	**47.4**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 17:42	7440-23-5	
Total Hardness by 2340B	**353**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 17:42		
Uranium-238	**0.0025**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 17:37	7440-61-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 17:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:50	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-10-090313 **Lab ID: 10240736010** Collected: 09/03/13 10:48 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0035J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 17:47	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 17:47	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 17:47	7440-43-9	
Calcium	**98.6**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 17:52	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 17:47	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 17:47	7439-89-6	
Lead	**0.00018**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 17:47	7439-92-1	
Magnesium	**25.2**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 17:52	7439-95-4	
Manganese	**0.46**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 17:52	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 17:47	7440-09-7	
Silica	**19.4**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 17:52	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 17:47	7440-22-4	
Sodium	**46.9**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 17:52	7440-23-5	
Total Hardness by 2340B	**350**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 17:52		
Uranium-238	**0.0024**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 17:47	7440-61-1	
Zinc	**0.23**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 17:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:52	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-11-090313 **Lab ID: 10240736011** Collected: 09/03/13 10:50 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.013**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 17:57	7429-90-5	
Arsenic	**0.0023**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 17:57	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 17:57	7440-43-9	
Calcium	**102**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 18:02	7440-70-2	M1
Copper	**0.016**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 17:57	7440-50-8	
Iron	**0.036J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 17:57	7439-89-6	
Lead	**0.00054**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 17:57	7439-92-1	
Magnesium	**26.1**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 18:02	7439-95-4	
Manganese	**0.37**	mg/L	0.00050	0.00018	1	09/09/13 08:20	09/11/13 17:57	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 17:57	7440-09-7	
Silica	**20.2**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 18:02	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 17:57	7440-22-4	M1
Sodium	**47.7**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 18:02	7440-23-5	M1
Total Hardness by 2340B	**361**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 18:02		
Uranium-238	**0.0030**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 17:57	7440-61-1	
Zinc	**0.23**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 17:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 12:59	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-12-090313 **Lab ID: 10240736012** Collected: 09/03/13 10:52 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.012**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 18:07	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 18:07	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 18:07	7440-43-9	
Calcium	**99.5**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 18:13	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 18:07	7440-50-8	
Iron	**0.035J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 18:07	7439-89-6	
Lead	**0.00043**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 18:07	7439-92-1	
Magnesium	**25.5**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 18:13	7439-95-4	
Manganese	**0.36**	mg/L	0.00050	0.00018	1	09/09/13 08:20	09/11/13 18:07	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 18:07	7440-09-7	
Silica	**19.8**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 18:13	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 18:07	7440-22-4	
Sodium	**46.8**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 18:13	7440-23-5	
Total Hardness by 2340B	**354**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 18:13		
Uranium-238	**0.0027**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 18:07	7440-61-1	
Zinc	**0.22**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 18:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:02	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-13-090313 **Lab ID: 10240736013** Collected: 09/03/13 10:56 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0028J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 18:41	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 18:41	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 18:41	7440-43-9	
Calcium	**98.6**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 18:46	7440-70-2	
Copper	**0.017**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 18:41	7440-50-8	
Iron	**0.023J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 18:41	7439-89-6	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 18:41	7439-92-1	
Magnesium	**25.8**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 18:46	7439-95-4	
Manganese	**0.50**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 18:46	7439-96-5	
Potassium	**8.7**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 18:41	7440-09-7	
Silica	**19.5**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 18:46	7631-86-9	
Silver	**0.000064J**	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 18:41	7440-22-4	B
Sodium	**47.0**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 18:46	7440-23-5	
Total Hardness by 2340B	**353**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 18:46		
Uranium-238	**0.0024**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 18:41	7440-61-1	
Zinc	**0.26**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 18:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:04	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-14-090313 **Lab ID: 10240736014** Collected: 09/03/13 10:58 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0032J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 18:51	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 18:51	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 18:51	7440-43-9	
Calcium	**98.8**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 18:56	7440-70-2	
Copper	**0.017**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 18:51	7440-50-8	
Iron	**0.027J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 18:51	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 18:51	7439-92-1	
Magnesium	**25.9**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 18:56	7439-95-4	
Manganese	**0.54**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 18:56	7439-96-5	
Potassium	**8.5**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 18:51	7440-09-7	
Silica	**19.9**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 18:56	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 18:51	7440-22-4	
Sodium	**46.8**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 18:56	7440-23-5	
Total Hardness by 2340B	**353**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 18:56		
Uranium-238	**0.0024**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 18:51	7440-61-1	
Zinc	**0.26**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 18:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:07	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-15-090313 **Lab ID: 10240736015** Collected: 09/03/13 11:00 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0032J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 19:01	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 19:01	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 19:01	7440-43-9	
Calcium	**103**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 19:07	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 19:01	7440-50-8	
Iron	**0.018J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 19:01	7439-89-6	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 19:01	7439-92-1	
Magnesium	**27.1**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 19:07	7439-95-4	
Manganese	**0.51**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 19:07	7439-96-5	
Potassium	**8.5**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 19:01	7440-09-7	
Silica	**20.1**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 19:07	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 19:01	7440-22-4	
Sodium	**49.8**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 19:07	7440-23-5	
Total Hardness by 2340B	**369**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 19:07		
Uranium-238	**0.0025**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 19:01	7440-61-1	
Zinc	**0.21**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 19:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:09	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-16-090313 **Lab ID: 10240736016** Collected: 09/03/13 11:02 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0017J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 19:12	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 19:12	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 19:12	7440-43-9	
Calcium	**103**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 19:17	7440-70-2	
Copper	**0.0096**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 19:12	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 19:12	7439-89-6	
Lead	**0.00010**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 19:12	7439-92-1	
Magnesium	**27.1**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 19:17	7439-95-4	
Manganese	**0.47**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 19:17	7439-96-5	
Potassium	**8.4**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 19:12	7440-09-7	
Silica	**20.1**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 19:17	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 19:12	7440-22-4	
Sodium	**49.8**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 19:17	7440-23-5	
Total Hardness by 2340B	**369**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 19:17		
Uranium-238	**0.0019**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 19:12	7440-61-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 19:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:12	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-17-090313 **Lab ID: 10240736017** Collected: 09/03/13 11:04 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0024J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 19:22	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 19:22	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 19:22	7440-43-9	
Calcium	**106**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 19:27	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 19:22	7440-50-8	
Iron	**0.028J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 19:22	7439-89-6	
Lead	**0.000078J**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 19:22	7439-92-1	
Magnesium	**27.4**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 19:27	7439-95-4	
Manganese	**0.59**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 19:27	7439-96-5	
Potassium	**8.8**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 19:22	7440-09-7	
Silica	**20.5**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 19:27	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 19:22	7440-22-4	
Sodium	**50.4**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 19:27	7440-23-5	
Total Hardness by 2340B	**378**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 19:27		
Uranium-238	**0.0022**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 19:22	7440-61-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 19:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:19	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-18-090313 **Lab ID: 10240736018** Collected: 09/03/13 11:06 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0020J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 19:49	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 19:49	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 19:49	7440-43-9	
Calcium	**104**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 19:54	7440-70-2	
Copper	**0.016**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 19:49	7440-50-8	
Iron	**0.030J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 19:49	7439-89-6	
Lead	**0.000085J**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 19:49	7439-92-1	
Magnesium	**27.5**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 19:54	7439-95-4	
Manganese	**0.66**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 19:54	7439-96-5	
Potassium	**8.7**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 19:49	7440-09-7	
Silica	**20.5**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 19:54	7631-86-9	
Silver	**0.000068J**	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 19:49	7440-22-4	B
Sodium	**49.8**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 19:54	7440-23-5	
Total Hardness by 2340B	**373**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 19:54		
Uranium-238	**0.0027**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 19:49	7440-61-1	
Zinc	**0.25**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 19:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:22	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-19-090313 **Lab ID: 10240736019** Collected: 09/03/13 11:08 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0031J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 19:59	7429-90-5	
Arsenic	**0.0016**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 19:59	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 19:59	7440-43-9	
Calcium	**107**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 20:04	7440-70-2	
Copper	**0.011**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 19:59	7440-50-8	
Iron	**0.032J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 19:59	7439-89-6	
Lead	**0.000067J**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 19:59	7439-92-1	
Magnesium	**28.5**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 20:04	7439-95-4	
Manganese	**0.68**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 20:04	7439-96-5	
Potassium	**8.6**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 19:59	7440-09-7	
Silica	**21.0**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 20:04	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 19:59	7440-22-4	
Sodium	**51.7**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 20:04	7440-23-5	
Total Hardness by 2340B	**385**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 20:04		
Uranium-238	**0.0025**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 19:59	7440-61-1	
Zinc	**0.24**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 19:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:24	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-20-090313 **Lab ID: 10240736020** Collected: 09/03/13 11:10 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0018J**	mg/L	0.0040	0.0015	1	09/09/13 08:20	09/11/13 20:10	7429-90-5	
Arsenic	**0.0016**	mg/L	0.00050	0.000093	1	09/09/13 08:20	09/11/13 20:10	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/09/13 08:20	09/11/13 20:10	7440-43-9	
Calcium	**111**	mg/L	0.10	0.049	5	09/09/13 08:20	09/11/13 20:15	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	09/09/13 08:20	09/11/13 20:10	7440-50-8	
Iron	**0.031J**	mg/L	0.050	0.0059	1	09/09/13 08:20	09/11/13 20:10	7439-89-6	
Lead	**0.000059J**	mg/L	0.00010	0.000046	1	09/09/13 08:20	09/11/13 20:10	7439-92-1	
Magnesium	**30.0**	mg/L	0.025	0.012	5	09/09/13 08:20	09/11/13 20:15	7439-95-4	
Manganese	**0.71**	mg/L	0.0025	0.00092	5	09/09/13 08:20	09/11/13 20:15	7439-96-5	
Potassium	**9.0**	mg/L	0.020	0.0047	1	09/09/13 08:20	09/11/13 20:10	7440-09-7	
Silica	**21.7**	mg/L	0.27	0.13	5	09/09/13 08:20	09/11/13 20:15	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/09/13 08:20	09/11/13 20:10	7440-22-4	
Sodium	**53.8**	mg/L	0.25	0.051	5	09/09/13 08:20	09/11/13 20:15	7440-23-5	
Total Hardness by 2340B	**402**	mg/L	0.36	0.18	5	09/09/13 08:20	09/11/13 20:15		
Uranium-238	**0.0026**	mg/L	0.00050	0.00010	1	09/09/13 08:20	09/11/13 20:10	7440-61-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	09/09/13 08:20	09/11/13 20:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/12/13 12:06	09/16/13 13:26	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-21-090313 **Lab ID: 10240736021** Collected: 09/03/13 11:12 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.029**	mg/L	0.0040	0.0015	1	09/13/13 12:34	09/16/13 16:59	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.000093	1	09/13/13 12:34	09/18/13 10:59	7440-38-2	
Cadmium	**0.000042J**	mg/L	0.000080	0.000032	1	09/13/13 12:34	09/16/13 16:59	7440-43-9	
Calcium	**35.2**	mg/L	0.10	0.049	5	09/13/13 12:34	09/16/13 17:03	7440-70-2	
Copper	**0.0021**	mg/L	0.00050	0.00017	1	09/13/13 12:34	09/16/13 16:59	7440-50-8	
Iron	**0.0061J**	mg/L	0.050	0.0059	1	09/13/13 12:34	09/16/13 16:59	7439-89-6	
Lead	**0.0021**	mg/L	0.00010	0.000046	1	09/13/13 12:34	09/16/13 16:59	7439-92-1	
Magnesium	**0.35**	mg/L	0.0050	0.0024	1	09/13/13 12:34	09/16/13 16:59	7439-95-4	
Manganese	**0.0056**	mg/L	0.00050	0.00018	1	09/13/13 12:34	09/18/13 10:59	7439-96-5	
Potassium	**0.97**	mg/L	0.020	0.0047	1	09/13/13 12:34	09/18/13 10:59	7440-09-7	
Silica	**4.7**	mg/L	0.27	0.13	5	09/13/13 12:34	09/16/13 17:03	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/13/13 12:34	09/16/13 16:59	7440-22-4	
Sodium	**6.2**	mg/L	0.050	0.010	1	09/13/13 12:34	09/18/13 10:59	7440-23-5	
Total Hardness by 2340B	**89.4**	mg/L	0.36	0.18	5	09/13/13 12:34	09/16/13 17:03		
Uranium-238	ND	mg/L	0.00050	0.00010	1	09/13/13 12:34	09/16/13 16:59	7440-61-1	
Zinc	**0.0085**	mg/L	0.0050	0.00098	1	09/13/13 12:34	09/18/13 10:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/14/13 08:36	09/16/13 10:54	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Sample: LAO-BS-22-090313 **Lab ID: 10240736022** Collected: 09/03/13 11:14 Received: 09/04/13 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.029**	mg/L	0.0040	0.0015	1	09/13/13 12:34	09/16/13 17:08	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.000093	1	09/13/13 12:34	09/18/13 11:04	7440-38-2	
Cadmium	**0.000041J**	mg/L	0.000080	0.000032	1	09/13/13 12:34	09/16/13 17:08	7440-43-9	
Calcium	**35.8**	mg/L	0.10	0.049	5	09/13/13 12:34	09/16/13 17:13	7440-70-2	
Copper	**0.0011**	mg/L	0.00050	0.00017	1	09/13/13 12:34	09/16/13 17:08	7440-50-8	
Iron	**0.0063J**	mg/L	0.050	0.0059	1	09/13/13 12:34	09/16/13 17:08	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	09/13/13 12:34	09/16/13 17:08	7439-92-1	
Magnesium	**0.36**	mg/L	0.0050	0.0024	1	09/13/13 12:34	09/16/13 17:08	7439-95-4	
Manganese	**0.0059**	mg/L	0.00050	0.00018	1	09/13/13 12:34	09/18/13 11:04	7439-96-5	
Potassium	**0.98**	mg/L	0.020	0.0047	1	09/13/13 12:34	09/18/13 11:04	7440-09-7	
Silica	**5.1**	mg/L	0.27	0.13	5	09/13/13 12:34	09/16/13 17:13	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	09/13/13 12:34	09/16/13 17:08	7440-22-4	
Sodium	**6.6**	mg/L	0.050	0.010	1	09/13/13 12:34	09/18/13 11:04	7440-23-5	
Total Hardness by 2340B	**90.7**	mg/L	0.36	0.18	5	09/13/13 12:34	09/16/13 17:13		
Uranium-238	ND	mg/L	0.00050	0.00010	1	09/13/13 12:34	09/16/13 17:08	7440-61-1	
Zinc	**0.0072**	mg/L	0.0050	0.00098	1	09/13/13 12:34	09/18/13 11:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/14/13 08:36	09/16/13 10:57	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

QC Batch: MERP/9179 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240736001, 10240736002, 10240736003, 10240736004, 10240736005, 10240736006, 10240736007, 10240736008, 10240736009, 10240736010, 10240736011, 10240736012, 10240736013, 10240736014, 10240736015, 10240736016, 10240736017, 10240736018, 10240736019, 10240736020

METHOD BLANK: 1516869 Matrix: Water
Associated Lab Samples: 10240736001, 10240736002, 10240736003, 10240736004, 10240736005, 10240736006, 10240736007, 10240736008, 10240736009, 10240736010, 10240736011, 10240736012, 10240736013, 10240736014, 10240736015, 10240736016, 10240736017, 10240736018, 10240736019, 10240736020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/16/13 12:15	

LABORATORY CONTROL SAMPLE: 1516870

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0055	111	85-115	

MATRIX SPIKE SAMPLE: 1516873

Parameter	Units	10240736020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0054	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522967 1522968

Parameter	Units	10240736002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00033	.005	.005	0.0050	0.0049	92	92	85-115	.4	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

QC Batch: MERP/9241 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10240736021, 10240736022

METHOD BLANK: 1524620 | Matrix: Water
Associated Lab Samples: 10240736021, 10240736022

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/16/13 10:37	

LABORATORY CONTROL SAMPLE: 1524621

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524882 1524883

Parameter	Units	10240736022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0048	99	96	85-115	3	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

QC Batch: MPRP/41670 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10240736001, 10240736002, 10240736003, 10240736004, 10240736005, 10240736006, 10240736007, 10240736008, 10240736009, 10240736010, 10240736011, 10240736012, 10240736013, 10240736014, 10240736015, 10240736016, 10240736017, 10240736018, 10240736019, 10240736020

METHOD BLANK: 1517091 Matrix: Water
Associated Lab Samples: 10240736001, 10240736002, 10240736003, 10240736004, 10240736005, 10240736006, 10240736007, 10240736008, 10240736009, 10240736010, 10240736011, 10240736012, 10240736013, 10240736014, 10240736015, 10240736016, 10240736017, 10240736018, 10240736019, 10240736020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	09/11/13 15:23	
Arsenic	mg/L	ND	0.00050	09/11/13 15:23	
Cadmium	mg/L	ND	0.000080	09/11/13 15:23	
Calcium	mg/L	ND	0.020	09/11/13 15:23	
Copper	mg/L	ND	0.00050	09/11/13 15:23	
Iron	mg/L	ND	0.050	09/11/13 15:23	
Lead	mg/L	ND	0.00010	09/11/13 15:23	
Magnesium	mg/L	ND	0.0050	09/11/13 15:23	
Manganese	mg/L	ND	0.00050	09/11/13 15:23	
Potassium	mg/L	ND	0.020	09/11/13 15:23	
Silver	mg/L	0.000067J	0.00050	09/11/13 15:23	
Sodium	mg/L	ND	0.050	09/11/13 15:23	
Uranium-238	mg/L	ND	0.00050	09/11/13 15:23	
Zinc	mg/L	ND	0.0050	09/11/13 15:23	

LABORATORY CONTROL SAMPLE: 1517092

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.079	99	85-115	
Cadmium	mg/L	.08	0.079	99	85-115	
Calcium	mg/L	1	0.94	94	85-115	
Copper	mg/L	.08	0.075	93	85-115	
Iron	mg/L	1	0.97	97	85-115	
Lead	mg/L	.08	0.087	108	85-115	
Magnesium	mg/L	1	1.0	101	85-115	
Manganese	mg/L	.08	0.081	101	85-115	
Potassium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.073	91	85-115	
Sodium	mg/L	1	1.0	100	85-115	
Uranium-238	mg/L	.08	0.080	100	85-115	
Zinc	mg/L	.08	0.078	97	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1517093 1517094

Parameter	Units	10240736001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0057	.08	.08	0.081	0.082	94	96	70-130	1	20	
Arsenic	mg/L	0.0026	.08	.08	0.086	0.087	105	105	70-130	.6	20	
Cadmium	mg/L	0.0019	.08	.08	0.084	0.084	103	103	70-130	.1	20	
Calcium	mg/L	98.5	1	1	99.2	99.1	66	58	70-130	.08	20	E,M1
Copper	mg/L	0.022	.08	.08	0.10	0.10	100	101	70-130	1	20	
Iron	mg/L	0.021J	1	1	0.99	0.99	97	97	70-130	.04	20	
Lead	mg/L	0.00038	.08	.08	0.083	0.082	103	102	70-130	.6	20	
Magnesium	mg/L	25.0	1	1	26.8	26.8	180	176	70-130	.1	20	M1
Manganese	mg/L	0.69	.08	.08	0.77	0.77	103	101	70-130	.2	20	
Potassium	mg/L	8.1	1	1	9.1	9.1	96	97	70-130	.1	20	
Silver	mg/L	ND	.08	.08	0.043	0.040	53	50	70-130	6	20	M1
Sodium	mg/L	45.1	1	1	46.7	46.8	162	172	70-130	.2	20	E,M1
Uranium-238	mg/L	0.0036	.08	.08	0.084	0.084	101	101	70-130	.2	20	
Zinc	mg/L	0.37	.08	.08	0.45	0.45	110	110	70-130	.09	20	

MATRIX SPIKE SAMPLE: 1517095

Parameter	Units	10240736011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.013	.08	0.099	107	70-130	
Arsenic	mg/L	0.0023	.08	0.086	104	70-130	
Cadmium	mg/L	0.0016	.08	0.082	101	70-130	
Calcium	mg/L	102	1	101	-96	70-130	E,M1
Copper	mg/L	0.016	.08	0.091	94	70-130	
Iron	mg/L	0.036J	1	1.0	98	70-130	
Lead	mg/L	0.00054	.08	0.084	105	70-130	
Magnesium	mg/L	26.1	1	27.4	126	70-130	
Manganese	mg/L	0.37	.08	0.45	98	70-130	
Potassium	mg/L	8.2	1	9.0	80	70-130	
Silver	mg/L	ND	.08	0.045	57	70-130	M1
Sodium	mg/L	47.7	1	49.5	178	70-130	E,M1
Uranium-238	mg/L	0.0030	.08	0.084	101	70-130	
Zinc	mg/L	0.23	.08	0.31	98	70-130	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

QC Batch: MPRP/41671 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10240736021, 10240736022

METHOD BLANK: 1517096 | Matrix: Water
Associated Lab Samples: 10240736021, 10240736022

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0024J	0.0040	09/16/13 15:59	
Arsenic	mg/L	ND	0.00050	09/18/13 10:33	
Cadmium	mg/L	ND	0.000080	09/16/13 15:59	
Calcium	mg/L	ND	0.020	09/16/13 15:59	
Copper	mg/L	ND	0.00050	09/16/13 15:59	
Iron	mg/L	ND	0.050	09/16/13 15:59	
Lead	mg/L	ND	0.00010	09/16/13 15:59	
Magnesium	mg/L	0.0031J	0.0050	09/16/13 15:59	
Manganese	mg/L	ND	0.00050	09/18/13 10:33	
Potassium	mg/L	ND	0.020	09/18/13 10:33	
Silver	mg/L	0.000069J	0.00050	09/16/13 15:59	
Sodium	mg/L	0.011J	0.050	09/18/13 10:33	
Uranium-238	mg/L	ND	0.00050	09/16/13 15:59	
Zinc	mg/L	ND	0.0050	09/18/13 10:33	

LABORATORY CONTROL SAMPLE: 1517097

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.078	98	85-115	
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Calcium	mg/L	1	1.0	103	85-115	
Copper	mg/L	.08	0.081	102	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.082	102	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Manganese	mg/L	.08	0.080	100	85-115	
Potassium	mg/L	1	0.97	97	85-115	
Silver	mg/L	.08	0.079	99	85-115	
Sodium	mg/L	1	1.0	104	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.085	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524183 1524184

Parameter	Units	10240734003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.096	.08	.08	0.18	0.19	106	119	70-130	6	20	
Arsenic	mg/L	0.033	.08	.08	0.12	0.12	107	110	70-130	2	20	
Cadmium	mg/L	0.023	.08	.08	0.10	0.10	96	101	70-130	4	20	

REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524183 1524184

Parameter	Units	10240734003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	140	1	1	125	124	-1460	-1540	70-130	.6	20	E,M1
Copper	mg/L	0.50	.08	.08	0.56	0.57	68	88	70-130	3	20	M1
Iron	mg/L	2.7	1	1	3.6	3.8	91	109	70-130	5	20	
Lead	mg/L	0.0020	.08	.08	0.075	0.077	91	94	70-130	3	20	
Magnesium	mg/L	32.0	1	1	31.1	33.0	-94	98	70-130	6	20	M1
Manganese	mg/L	4630 ug/L	.08	.08	4.9	4.9	290	325	70-130	.6	20	E,M1
Potassium	mg/L	8790 ug/L	1	1	9.9	10.1	111	131	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.024	0.028	30	35	70-130	16	20	M1
Sodium	mg/L	61400 ug/L	1	1	62.2	63.3	88	190	70-130	2	20	E,M1
Uranium-238	mg/L	0.0098	.08	.08	0.087	0.089	97	99	70-130	2	20	
Zinc	mg/L	5.8	.08	.08	6.0	6.1	335	452	70-130	2	20	E,M1

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands-Revised
Pace Project No.: 10240736

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10240736001	**LAO-BS-1-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736002	**LAO-BS-2-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736003	**LAO-BS-3-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736004	**LAO-BS-4-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736005	**LAO-BS-5-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736006	**LAO-BS-6-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736007	**LAO-BS-7-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736008	**LAO-BS-8-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736009	**LAO-BS-9-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736010	**LAO-BS-10-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736011	**LAO-BS-11-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736012	**LAO-BS-12-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736013	**LAO-BS-13-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736014	**LAO-BS-14-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736015	**LAO-BS-15-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736016	**LAO-BS-16-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736017	**LAO-BS-17-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736018	**LAO-BS-18-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736019	**LAO-BS-19-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736020	**LAO-BS-20-090313**	EPA 200.8	MPRP/41670	EPA 200.8	ICPM/17543
10240736021	**LAO-BS-21-090313**	EPA 200.8	MPRP/41671	EPA 200.8	ICPM/17544
10240736022	**LAO-BS-22-090313**	EPA 200.8	MPRP/41671	EPA 200.8	ICPM/17544
10240736001	**LAO-BS-1-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736002	**LAO-BS-2-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736003	**LAO-BS-3-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736004	**LAO-BS-4-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736005	**LAO-BS-5-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736006	**LAO-BS-6-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736007	**LAO-BS-7-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736008	**LAO-BS-8-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736009	**LAO-BS-9-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736010	**LAO-BS-10-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736011	**LAO-BS-11-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736012	**LAO-BS-12-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736013	**LAO-BS-13-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736014	**LAO-BS-14-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736015	**LAO-BS-15-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736016	**LAO-BS-16-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736017	**LAO-BS-17-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736018	**LAO-BS-18-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736019	**LAO-BS-19-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736020	**LAO-BS-20-090313**	EPA 245.1	MERP/9179	EPA 245.1	MERC/10534
10240736021	**LAO-BS-21-090313**	EPA 245.1	MERP/9241	EPA 245.1	MERC/10545
10240736022	**LAO-BS-22-090313**	EPA 245.1	MERP/9241	EPA 245.1	MERC/10545

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1160

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10240736

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-~~BS-1~~ BS-1-090313	9/3/13	10:30		X						1				X										10240736001
	LAO-~~BS-1~~ BS-2-090313	9/3/13	10:32		X						1				X										002
	LAO-~~BS-2~~ BS-3-090313	9/3/13	10:34		X						1				X										003
	LAO-BS-4-090313	9/3/13	10:36		X						1				X										004
	LAO-BS-5-090313	9/3/13	10:38		X						1				X										005
	LAO-BS-6-090313	9/3/13	10:40		X						1				X										006
	LAO-BS-7-090313	9/3/13	10:42		X						1				X										007
	LAO-BS-8-090313	9/3/13	10:44		X						1				X										008
	LAO-BS-9-090313	9/3/13	10:46		X						1				X										009
	LAO-BS-10-090313	9/3/13	10:48		X						1				X										010

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey						
Sampler's Company: Pioneer Technical Services	PTS	9/3/13	11:30	PACE	9-4-13	950
Shipment Method: FedEx Ship Date: 9/3/13						
Shipment Tracking No: 554091977302						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10240736

Lab Name:	Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM:	Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode: Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-~~BS4~~ BS-11-090313	9/3/13	10:50		X						1			X		10240736011
	LAO-~~BS4~~ BS-12-090313	9/3/13	10:52		X						1			X		012
	LAO-~~BS2~~ BS-13-090313	9/3/13	10:56		X						1			X		013
	LAO-BS-14-090313	9/3/13	10:58		X						1			X		014
	LAO-BS-15-090313	9/3/13	11:00		X						1			X		015
	LAO-BS-16-090313	9/3/13	11:02		X						1			X		016
	LAO-BS-17-090313	9/3/13	11:04		X						1			X		017
	LAO-BS-18-090313	9/3/13	11:06		X						1			X		018
	LAO-BS-19-090313	9/3/13	11:08		X						1			X		019
	LAO-BS-20-090313	9/3/13	11:10		X						1			X		020

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	9/3/13	11:30	[signature] / PACE	9-4-13	450
Shipment Method: FedEx Ship Date: 9/3/13						
Shipment Tracking No: 954091977302						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 19 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10240736

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x / Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	~~LAO-SS-1~~ LAO-BS-21-090313	9/3/13	11:12		x						1				x			1							10240736021
	~~LAO-SS-1~~ LAO-BS-22-090313	9/3/13	11:14		x						1				x			1							022
	~~LAO-SS-2~~				x						0														

Sampler's Name: Thomas Hickey	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] / PTS	9/3/13	11:30	[signature] PACE	9-4-13	950
Shipment Method: Fed Ex Ship Date: 9/3/13						
Shipment Tracking No: 554091977302						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Technical

Project #: WO#: 10240736

10240736

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9197 7302

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.4 **Cooler Temp Corrected (°C):** 1.9 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.5 **Date and Initials of Person Examining Contents:** 9-4-13/AT

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-224/1
Per method, VOA pH is checked after analysis				Initial when completed: AT Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1210	Temp: 1.9	Corrected Temp:
Time: 9413 ~~1240~~ 1230	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: [signature] **Date:** 9/5/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
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(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory on September 06, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request.
Sample effected: 012

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10241031001	**SD0712-090313**	Water	09/04/13 16:07	09/06/13 08:45
10241031002	**SD0713-090313**	Water	09/04/13 16:12	09/06/13 08:45
10241031003	**SD0714-090313**	Water	09/04/13 16:15	09/06/13 08:45
10241031004	**SD0715-090313**	Water	09/04/13 16:18	09/06/13 08:45
10241031005	**SD0716-090313**	Water	09/04/13 16:24	09/06/13 08:45
10241031006	**SD0717-090313**	Water	09/04/13 16:26	09/06/13 08:45
10241031007	**SD0718-090313**	Water	09/04/13 16:29	09/06/13 08:45
10241031008	**SD0719-090313**	Water	09/04/13 16:32	09/06/13 08:45
10241031009	**SD0720-090313**	Water	09/04/13 16:35	09/06/13 08:45
10241031010	**SD0721-090313**	Water	09/04/13 16:40	09/06/13 08:45
10241031011	**SD0722-090313**	Water	09/04/13 16:43	09/06/13 08:45
10241031012	**SD0723-090313**	Water	09/04/13 16:47	09/06/13 08:45
10241031013	**SD0724-090313**	Water	09/05/13 09:20	09/06/13 08:45
10241031014	**SD0725-090313**	Water	09/05/13 09:25	09/06/13 08:45
10241031015	**SD0726-090313**	Water	09/05/13 09:30	09/06/13 08:45
10241031016	**SD0727-090313**	Water	09/05/13 09:34	09/06/13 08:45

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10241031001	**SD0712-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031002	**SD0713-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031003	**SD0714-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031004	**SD0715-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031005	**SD0716-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031006	**SD0717-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031007	**SD0718-090313**	EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031008	**SD0719-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031009	**SD0720-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031010	**SD0721-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031011	**SD0722-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031012	**SD0723-090313**	EPA 200.8	AJM	12
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	HNKH	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10241031013	**SD0724-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10241031014	**SD0725-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10241031015	**SD0726-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10241031016	**SD0727-090313**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
16 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41726

B: Analyte was detected in the associated method blank.

- BLANK for HBN 267203 [MPRP/417 (Lab ID: 1519510)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41726

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10241031003,10241031011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1522873)
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
16 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41725

B: Analyte was detected in the associated method blank.

- BLANK for HBN 267202 [MPRP/417 (Lab ID: 1519505)
  - Copper, Dissolved
  - Zinc, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
16 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
15 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0723-090313 (Lab ID: 10241031012)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
13 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0723-090313 (Lab ID: 10241031012)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0723-090313 (Lab ID: 10241031012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
13 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16017

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10240339041,10241031006

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1523490)
  - Sulfate
- MSD (Lab ID: 1523491)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0723-090313 (Lab ID: 10241031012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0723-090313 (Lab ID: 10241031012)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0712-090313 **Lab ID: 10241031001** Collected: 09/04/13 16:07 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:06	7440-38-2	
Cadmium	**0.0055**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:06	7440-43-9	
Copper	**0.30**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 18:06	7440-50-8	
Lead	**0.033**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:06	7439-92-1	
Zinc	**2.5**	mg/L	0.050	0.0098	10	09/12/13 10:58	09/17/13 18:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0057**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:17	7440-38-2	
Cadmium, Dissolved	**0.0038**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:17	7440-43-9	
Copper, Dissolved	**0.16**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:17	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:17	7439-92-1	
Zinc, Dissolved	**1.7**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 20:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 16:37	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**61.9**	mg/L	10.0	5.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**66.4**	mg/L	12.5	6.2	5		09/13/13 09:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0713-090313 **Lab ID: 10241031002** Collected: 09/04/13 16:12 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:11	7440-38-2	
Cadmium	**0.0062**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:11	7440-43-9	
Copper	**0.48**	mg/L	0.0050	0.0017	10	09/12/13 10:58	09/17/13 18:14	7440-50-8	
Lead	**0.051**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:11	7439-92-1	
Zinc	**3.1**	mg/L	0.050	0.0098	10	09/12/13 10:58	09/17/13 18:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0052**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:22	7440-38-2	
Cadmium, Dissolved	**0.0039**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:22	7440-43-9	
Copper, Dissolved	**0.21**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:22	7440-50-8	
Lead, Dissolved	**0.00077**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:22	7439-92-1	
Zinc, Dissolved	**2.0**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 20:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:31	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 16:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**143**	mg/L	20.0	10.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**71.3**	mg/L	12.5	6.2	5		09/13/13 09:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0714-090313 **Lab ID: 10241031003** Collected: 09/04/13 16:15 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.036**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:17	7440-38-2	
Cadmium	**0.010**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:17	7440-43-9	
Copper	**1.1**	mg/L	0.0025	0.00087	5	09/12/13 10:58	09/17/13 18:19	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:17	7439-92-1	
Zinc	**5.1**	mg/L	0.10	0.020	20	09/12/13 10:58	09/17/13 18:22	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0053**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:33	7440-38-2	
Cadmium, Dissolved	**0.0044**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:33	7440-43-9	
Copper, Dissolved	**0.31**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:33	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:33	7439-92-1	
Zinc, Dissolved	**1.2**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 20:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 16:42	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**358**	mg/L	20.0	10.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**66.7**	mg/L	12.5	6.2	5		09/13/13 09:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0715-090313 **Lab ID: 10241031004** Collected: 09/04/13 16:18 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:39	7440-38-2	
Cadmium	**0.00039**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:39	7440-43-9	
Copper	**0.065**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 18:39	7440-50-8	
Lead	**0.010**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:39	7439-92-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	09/12/13 10:58	09/17/13 18:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.019**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:47	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:47	7440-43-9	
Copper, Dissolved	**0.034**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:47	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:47	7439-92-1	
Zinc, Dissolved	**0.065**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 20:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:40	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 16:50	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**33.5**	mg/L	16.7	8.3	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.1**	mg/L	2.5	1.2	1		09/13/13 09:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0716-090313 **Lab ID: 10241031005** Collected: 09/04/13 16:24 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0076**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:42	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:42	7440-43-9	
Copper	**0.24**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 18:42	7440-50-8	
Lead	**0.021**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:42	7439-92-1	
Zinc	**0.44**	mg/L	0.025	0.0049	5	09/12/13 10:58	09/17/13 18:45	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0055**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:50	7440-38-2	
Cadmium, Dissolved	**0.00090**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:50	7440-43-9	
Copper, Dissolved	**0.19**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:50	7440-50-8	
Lead, Dissolved	**0.0044**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:50	7439-92-1	
Zinc, Dissolved	**0.35**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 20:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 16:57	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**56.7**	mg/L	10.0	5.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**3.2**	mg/L	2.5	1.2	1		09/13/13 09:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0717-090313 **Lab ID: 10241031006** Collected: 09/04/13 16:26 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0078**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:48	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:48	7440-43-9	
Copper	**0.25**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 18:48	7440-50-8	
Lead	**0.022**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:48	7439-92-1	
Zinc	**0.45**	mg/L	0.025	0.0049	5	09/12/13 10:58	09/17/13 18:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0054**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:53	7440-38-2	
Cadmium, Dissolved	**0.00090**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:53	7440-43-9	
Copper, Dissolved	**0.18**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:53	7440-50-8	
Lead, Dissolved	**0.0043**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:53	7439-92-1	
Zinc, Dissolved	**0.35**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 20:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000067J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 16:59	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**55.8**	mg/L	10.0	5.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**3.6**	mg/L	2.5	1.2	1		09/13/13 09:47	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0718-090313 **Lab ID: 10241031007** Collected: 09/04/13 16:29 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:53	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:53	7440-43-9	
Copper	**0.00020J**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 18:53	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:53	7439-92-1	
Zinc	**0.0017J**	mg/L	0.0050	0.00098	1	09/12/13 10:58	09/17/13 18:53	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:56	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:56	7440-43-9	
Copper, Dissolved	**0.00024J**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:56	7440-50-8	B
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:56	7439-92-1	
Zinc, Dissolved	**0.0025J**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 20:56	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:02	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/13/13 09:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0719-090313 **Lab ID: 10241031008** Collected: 09/04/13 16:32 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 18:56	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 18:56	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 18:56	7440-50-8	
Lead	**0.075**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 18:56	7439-92-1	
Zinc	**0.50**	mg/L	0.025	0.0049	5	09/12/13 10:58	09/17/13 18:59	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 20:58	7440-38-2	
Cadmium, Dissolved	**0.00058**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 20:58	7440-43-9	
Copper, Dissolved	**0.086**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 20:58	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 20:58	7439-92-1	
Zinc, Dissolved	**0.095**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 20:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0011**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:55	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:04	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**219**	mg/L	20.0	10.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.8**	mg/L	2.5	1.2	1		09/13/13 09:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0720-090313 **Lab ID: 10241031009** Collected: 09/04/13 16:35 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:10	7440-38-2	
Cadmium	**0.0032**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:10	7440-43-9	
Copper	**0.21**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 19:10	7440-50-8	
Lead	**0.097**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:10	7439-92-1	
Zinc	**0.79**	mg/L	0.025	0.0049	5	09/12/13 10:58	09/17/13 19:13	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:01	7440-38-2	
Cadmium, Dissolved	**0.00084**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:01	7440-43-9	
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:01	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:01	7439-92-1	
Zinc, Dissolved	**0.21**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 21:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00018J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 15:58	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:12	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**260**	mg/L	20.0	10.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**20.9**	mg/L	2.5	1.2	1		09/13/13 09:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0721-090313 **Lab ID: 10241031010** Collected: 09/04/13 16:40 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:15	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:15	7440-43-9	
Copper	**0.097**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 19:15	7440-50-8	
Lead	**0.042**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:15	7439-92-1	
Zinc	**0.30**	mg/L	0.0050	0.00098	1	09/12/13 10:58	09/17/13 19:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0076**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:04	7440-38-2	
Cadmium, Dissolved	**0.00039**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:04	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:04	7440-50-8	
Lead, Dissolved	**0.0063**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:04	7439-92-1	
Zinc, Dissolved	**0.13**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 21:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000056J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:05	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000093J**	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:14	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**77.0**	mg/L	10.0	5.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.1**	mg/L	2.5	1.2	1		09/13/13 09:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0722-090313 **Lab ID: 10241031011** Collected: 09/04/13 16:43 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:18	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:18	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 19:18	7440-50-8	
Lead	**0.054**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:18	7439-92-1	
Zinc	**0.38**	mg/L	0.0050	0.00098	1	09/12/13 10:58	09/17/13 19:18	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0078**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:07	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:07	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:07	7440-50-8	
Lead, Dissolved	**0.0082**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:07	7439-92-1	
Zinc, Dissolved	**0.17**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 21:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:08	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:17	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**87.0**	mg/L	20.0	10.0	1		09/09/13 19:40		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.6**	mg/L	2.5	1.2	1		09/13/13 09:24	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0723-090313 **Lab ID: 10241031012** Collected: 09/04/13 16:47 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:24	7440-38-2	
Cadmium	**0.00083**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:24	7440-43-9	
Calcium	**31000**	ug/L	20.0	9.8	1	09/12/13 10:58	09/17/13 19:24	7440-70-2	
Copper	**0.070**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 19:24	7440-50-8	
Iron	**1540**	ug/L	50.0	5.9	1	09/12/13 10:58	09/17/13 19:24	7439-89-6	
Lead	**0.037**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:24	7439-92-1	
Magnesium	**7290**	ug/L	5.0	2.4	1	09/12/13 10:58	09/17/13 19:24	7439-95-4	
Manganese	**298**	ug/L	0.50	0.18	1	09/12/13 10:58	09/17/13 19:24	7439-96-5	
Potassium	**5330**	ug/L	20.0	4.7	1	09/12/13 10:58	09/17/13 19:24	7440-09-7	
Silica	**17300**	ug/L	53.5	26.8	1	09/12/13 10:58	09/17/13 19:24	7631-86-9	
Sodium	**11700**	ug/L	50.0	10.3	1	09/12/13 10:58	09/17/13 19:24	7440-23-5	
Zinc	**0.27**	mg/L	0.0050	0.00098	1	09/12/13 10:58	09/17/13 19:24	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0077**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:12	7440-38-2	
Cadmium, Dissolved	**0.00040**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:12	7440-43-9	
Copper, Dissolved	**0.038**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:12	7440-50-8	
Lead, Dissolved	**0.0084**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:12	7439-92-1	
Zinc, Dissolved	**0.11**	mg/L	0.0050	0.00098	1	09/12/13 10:55	09/17/13 21:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000058J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:10	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:19	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**79.4**	mg/L	5.0	2.5	1		01/03/14 13:05		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**68.4**	mg/L	10.0	5.0	1		09/09/13 19:40		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.4**	Std. Units	0.10	0.050	1		12/31/13 14:54		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	ND	mg/L	0.10	0.050	1		01/03/14 12:19	14797-55-8	H1
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		01/03/14 12:19		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.3**	mg/L	2.5	1.2	1		09/13/13 09:26	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**18.7**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0723-090313 **Lab ID: 10241031012** Collected: 09/04/13 16:47 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0724-090313 **Lab ID: 10241031013** Collected: 09/05/13 09:20 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:27	7440-38-2	
Cadmium	**0.0032**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:27	7440-43-9	
Copper	**0.33**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 19:27	7440-50-8	
Lead	**0.025**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:27	7439-92-1	
Zinc	**1.6**	mg/L	0.025	0.0049	5	09/12/13 10:58	09/17/13 19:29	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0071**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:24	7440-38-2	
Cadmium, Dissolved	**0.0022**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:24	7440-43-9	
Copper, Dissolved	**0.16**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:24	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:24	7439-92-1	
Zinc, Dissolved	**1.1**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 21:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000042J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**93.2**	mg/L	10.0	5.0	1		09/10/13 16:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**70.5**	mg/L	12.5	6.2	5		09/13/13 09:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0725-090313 **Lab ID: 10241031014** Collected: 09/05/13 09:25 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:40	7440-38-2	
Cadmium	**0.0034**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:40	7440-43-9	
Copper	**0.42**	mg/L	0.00050	0.00017	1	09/12/13 10:58	09/17/13 19:40	7440-50-8	
Lead	**0.034**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:40	7439-92-1	
Zinc	**1.7**	mg/L	0.025	0.0049	5	09/12/13 10:58	09/17/13 19:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0070**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:29	7440-38-2	
Cadmium, Dissolved	**0.0022**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:29	7440-43-9	
Copper, Dissolved	**0.22**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:29	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:29	7439-92-1	
Zinc, Dissolved	**1.2**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 21:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000051J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:22	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0726-090313 **Lab ID: 10241031015** Collected: 09/05/13 09:30 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.033**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:46	7440-38-2	
Cadmium	**0.0060**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:46	7440-43-9	
Copper	**0.89**	mg/L	0.0050	0.0017	10	09/12/13 10:58	09/17/13 19:49	7440-50-8	
Lead	**0.063**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:46	7439-92-1	
Zinc	**3.0**	mg/L	0.050	0.0098	10	09/12/13 10:58	09/17/13 19:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0035**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:35	7440-38-2	
Cadmium, Dissolved	**0.0026**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:35	7440-43-9	
Copper, Dissolved	**0.31**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:35	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:35	7439-92-1	
Zinc, Dissolved	**1.5**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 21:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:27	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Sample: SD0727-090313 **Lab ID: 10241031016** Collected: 09/05/13 09:34 Received: 09/06/13 08:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.030**	mg/L	0.00050	0.000093	1	09/12/13 10:58	09/17/13 19:51	7440-38-2	
Cadmium	**0.0063**	mg/L	0.000080	0.000032	1	09/12/13 10:58	09/17/13 19:51	7440-43-9	
Copper	**0.86**	mg/L	0.0050	0.0017	10	09/12/13 10:58	09/17/13 19:54	7440-50-8	
Lead	**0.069**	mg/L	0.00010	0.000046	1	09/12/13 10:58	09/17/13 19:51	7439-92-1	
Zinc	**3.2**	mg/L	0.050	0.0098	10	09/12/13 10:58	09/17/13 19:54	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0029**	mg/L	0.00050	0.000093	1	09/12/13 10:55	09/17/13 21:40	7440-38-2	
Cadmium, Dissolved	**0.0027**	mg/L	0.000080	0.000032	1	09/12/13 10:55	09/17/13 21:40	7440-43-9	
Copper, Dissolved	**0.28**	mg/L	0.00050	0.00017	1	09/12/13 10:55	09/17/13 21:40	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	09/12/13 10:55	09/17/13 21:40	7439-92-1	
Zinc, Dissolved	**1.6**	mg/L	0.025	0.0049	5	09/12/13 10:55	09/17/13 21:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	09/18/13 12:52	09/18/13 16:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/18/13 12:48	09/18/13 17:29	7439-97-6	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: MERP/9267 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013, 10241031014, 10241031015, 10241031016

METHOD BLANK: 1527179 Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013, 10241031014, 10241031015, 10241031016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/18/13 15:23	

LABORATORY CONTROL SAMPLE: 1527180

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	101	85-115	

MATRIX SPIKE SAMPLE: 1527183

Parameter	Units	10241031015 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0012	.005	0.0055	87	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527400 1527401

Parameter	Units	10241031004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0053	0.0051	106	101	85-115	4	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: MERP/9268 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031014, 10241031015, 10241031016

METHOD BLANK: 1527231 Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031014, 10241031015, 10241031016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/18/13 16:32	

LABORATORY CONTROL SAMPLE: 1527232

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527233 1527234

Parameter	Units	10241031004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0050	0.0049	101	99	85-115	2	20	

MATRIX SPIKE SAMPLE: 1527235

Parameter	Units	10241031014 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0051	103	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: MPRP/41726 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013, 10241031014, 10241031015, 10241031016

METHOD BLANK: 1519510 Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013, 10241031014, 10241031015, 10241031016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/17/13 18:00	
Cadmium	mg/L	ND	0.000080	09/17/13 18:00	
Calcium	ug/L	10.0J	20.0	09/17/13 18:00	
Copper	mg/L	ND	0.00050	09/17/13 18:00	
Iron	ug/L	ND	50.0	09/17/13 18:00	
Lead	mg/L	0.000048J	0.00010	09/17/13 18:00	
Magnesium	ug/L	ND	5.0	09/17/13 18:00	
Manganese	ug/L	0.31J	0.50	09/17/13 18:00	
Potassium	ug/L	ND	20.0	09/17/13 18:00	
Sodium	ug/L	11.2J	50.0	09/17/13 18:00	
Zinc	mg/L	0.0018J	0.0050	09/17/13 18:00	

LABORATORY CONTROL SAMPLE: 1519511

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.087	109	85-115	
Calcium	ug/L	1000	1010	101	85-115	
Copper	mg/L	.08	0.081	101	85-115	
Iron	ug/L	1000	1040	104	85-115	
Lead	mg/L	.08	0.085	106	85-115	
Magnesium	ug/L	1000	1000	100	85-115	
Manganese	ug/L	80	76.5	96	85-115	
Potassium	ug/L	1000	949	95	85-115	
Sodium	ug/L	1000	991	99	85-115	
Zinc	mg/L	.08	0.086	108	85-115	

MATRIX SPIKE SAMPLE: 1519514

Parameter	Units	10241031011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.012	.08	0.093	101	70-130	
Cadmium	mg/L	0.0010	.08	0.084	103	70-130	
Calcium	ug/L	32500	1000	33100	60	70-130	
Copper	mg/L	0.12	.08	0.20	95	70-130	
Iron	ug/L	2610	1000	3640	103	70-130	
Lead	mg/L	0.054	.08	0.13	97	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

MATRIX SPIKE SAMPLE: 1519514

Parameter	Units	10241031011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Magnesium	ug/L	8020	1000	8360	34	70-130	
Manganese	ug/L	347	80	395	61	70-130	
Potassium	ug/L	5770	1000	6200	43	70-130	
Sodium	ug/L	10100	1000	11200	113	70-130	
Zinc	mg/L	0.38	.08	0.46	101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522873 1522874

Parameter	Units	10241031003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.036	.08	.08	0.12	0.11	99	99	70-130	.3	20	
Cadmium	mg/L	0.010	.08	.08	0.097	0.095	108	106	70-130	1	20	
Calcium	ug/L				68200	69800				2	20	
Copper	mg/L	1.1	.08	.08	1.1	1.1	86	85	70-130	.01	20	
Iron	ug/L				10400	11100				6	20	
Lead	mg/L	0.17	.08	.08	0.24	0.25	86	90	70-130	1	20	
Magnesium	ug/L				19800	20600				3	20	
Manganese	ug/L				935	957				2	20	
Potassium	ug/L				8450	8660				2	20	
Sodium	ug/L				20300	20500				.9	20	
Zinc	mg/L	5.1	.08	.08	5.1	5.1	14	80	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: MPRP/41725 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013, 10241031014, 10241031015, 10241031016

METHOD BLANK: 1519505 — Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013, 10241031014, 10241031015, 10241031016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/17/13 20:11	
Cadmium, Dissolved	mg/L	ND	0.000080	09/17/13 20:11	
Copper, Dissolved	mg/L	0.00024J	0.00050	09/17/13 20:11	
Lead, Dissolved	mg/L	0.000047J	0.00010	09/17/13 20:11	
Zinc, Dissolved	mg/L	0.0025J	0.0050	09/17/13 20:11	

LABORATORY CONTROL SAMPLE: 1519506

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.081	101	85-115	
Cadmium, Dissolved	mg/L	.08	0.085	106	85-115	
Copper, Dissolved	mg/L	.08	0.082	102	85-115	
Lead, Dissolved	mg/L	.08	0.084	105	85-115	
Zinc, Dissolved	mg/L	.08	0.087	109	85-115	

MATRIX SPIKE SAMPLE: 1519509

Parameter	Units	10241031011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0078	.08	0.087	99	70-130	
Cadmium, Dissolved	mg/L	0.00038	.08	0.083	104	70-130	
Copper, Dissolved	mg/L	0.043	.08	0.12	100	70-130	
Lead, Dissolved	mg/L	0.0082	.08	0.087	98	70-130	
Zinc, Dissolved	mg/L	0.17	.08	0.25	100	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522875 1522876

Parameter	Units	10241031002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0052	.08	.08	0.086	0.085	101	99	70-130	1	20	
Cadmium, Dissolved	mg/L	0.0039	.08	.08	0.086	0.087	102	104	70-130	1	20	
Copper, Dissolved	mg/L	0.21	.08	.08	0.28	0.28	79	84	70-130	2	20	
Lead, Dissolved	mg/L	0.00077	.08	.08	0.081	0.079	100	98	70-130	2	20	
Zinc, Dissolved	mg/L	2.0	.08	.08	2.1	2.1	116	114	70-130	.09	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WET/33876 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10241031012

METHOD BLANK: 1604009 | Matrix: Water
Associated Lab Samples: 10241031012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WET/32173 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012

METHOD BLANK: 1519716 Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/09/13 19:40	

METHOD BLANK: 1519720 Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/09/13 19:40	

LABORATORY CONTROL SAMPLE: 1519717

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	80.6	81	80-120	

SAMPLE DUPLICATE: 1519718

Parameter	Units	10241031007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1519719

Parameter	Units	10241059001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WET/32184 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10241031013

METHOD BLANK: 1521027 | Matrix: Water
Associated Lab Samples: 10241031013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/10/13 16:52	

METHOD BLANK: 1521031 | Matrix: Water
Associated Lab Samples: 10241031013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/10/13 16:52	

LABORATORY CONTROL SAMPLE: 1521028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	80.4	80	80-120	

SAMPLE DUPLICATE: 1521030

Parameter	Units	10241012009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1521159

Parameter	Units	10241061001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	8.5J	11.5		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WET/33849
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 10241031012

LABORATORY CONTROL SAMPLE: 1603269

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	100	98-102	H6

SAMPLE DUPLICATE: 1603270

Parameter	Units	10237680008 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.7	6.7	.3	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WETA/17057
QC Batch Method: SM 4500-NO3 H
Analysis Method: SM 4500-NO3 H
Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10241031012

METHOD BLANK: 1604003
Matrix: Water
Associated Lab Samples: 10241031012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WETA/16017 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013

METHOD BLANK: 1523486 — Matrix: Water
Associated Lab Samples: 10241031001, 10241031002, 10241031003, 10241031004, 10241031005, 10241031006, 10241031007, 10241031008, 10241031009, 10241031010, 10241031011, 10241031012, 10241031013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/13/13 09:13	

LABORATORY CONTROL SAMPLE: 1523487

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.2	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523488 — 1523489

Parameter	Units	10240339041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.8	20	20	28.5	28.2	89	87	80-120	.9	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523490 — 1523491

Parameter	Units	10241031006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	3.6	20	20	29.3	29.4	129	129	80-120	.2	30	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WETA/17041 | Analysis Method: SM 4500-Cl E
QC Batch Method: SM 4500-Cl E | Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10241031012

METHOD BLANK: 1603873 | Matrix: Water
Associated Lab Samples: 10241031012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

QC Batch: WETA/17023
QC Batch Method: SM 4500-NO2 B
Analysis Method: SM 4500-NO2 B
Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10241031012

METHOD BLANK: 1603178
Matrix: Water
Associated Lab Samples: 10241031012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241031001	**SD0712-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031002	**SD0713-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031003	**SD0714-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031004	**SD0715-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031005	**SD0716-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031006	**SD0717-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031007	**SD0718-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031008	**SD0719-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031009	**SD0720-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031010	**SD0721-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031011	**SD0722-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031012	**SD0723-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031013	**SD0724-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031014	**SD0725-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031015	**SD0726-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031016	**SD0727-090313**	EPA 200.8	MPRP/41726	EPA 200.8	ICPM/17574
10241031001	**SD0712-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031002	**SD0713-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031003	**SD0714-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031004	**SD0715-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031005	**SD0716-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031006	**SD0717-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031007	**SD0718-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031008	**SD0719-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031009	**SD0720-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031010	**SD0721-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031011	**SD0722-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031012	**SD0723-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031013	**SD0724-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031014	**SD0725-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031015	**SD0726-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031016	**SD0727-090313**	EPA 200.8	MPRP/41725	EPA 200.8	ICPM/17575
10241031001	**SD0712-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031002	**SD0713-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031003	**SD0714-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031004	**SD0715-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031005	**SD0716-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031006	**SD0717-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031007	**SD0718-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031008	**SD0719-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031009	**SD0720-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031010	**SD0721-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031011	**SD0722-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031012	**SD0723-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031013	**SD0724-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031014	**SD0725-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031015	**SD0726-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573
10241031016	**SD0727-090313**	EPA 245.1	MERP/9267	EPA 245.1	MERC/10573

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241031001	**SD0712-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031002	**SD0713-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031003	**SD0714-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031004	**SD0715-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031005	**SD0716-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031006	**SD0717-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031007	**SD0718-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031008	**SD0719-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031009	**SD0720-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031010	**SD0721-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031011	**SD0722-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031012	**SD0723-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031014	**SD0725-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031015	**SD0726-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031016	**SD0727-090313**	EPA 245.1	MERP/9268	EPA 245.1	MERC/10572
10241031012	**SD0723-090313**	SM 2320B	WET/33876		
10241031001	**SD0712-090313**	SM 2540D	WET/32173		
10241031002	**SD0713-090313**	SM 2540D	WET/32173		
10241031003	**SD0714-090313**	SM 2540D	WET/32173		
10241031004	**SD0715-090313**	SM 2540D	WET/32173		
10241031005	**SD0716-090313**	SM 2540D	WET/32173		
10241031006	**SD0717-090313**	SM 2540D	WET/32173		
10241031007	**SD0718-090313**	SM 2540D	WET/32173		
10241031008	**SD0719-090313**	SM 2540D	WET/32173		
10241031009	**SD0720-090313**	SM 2540D	WET/32173		
10241031010	**SD0721-090313**	SM 2540D	WET/32173		
10241031011	**SD0722-090313**	SM 2540D	WET/32173		
10241031012	**SD0723-090313**	SM 2540D	WET/32173		
10241031013	**SD0724-090313**	SM 2540D	WET/32184		
10241031012	**SD0723-090313**	SM 4500-H+B	WET/33849		
10241031012	**SD0723-090313**	SM 4500-NO3 H	WETA/17057		
10241031001	**SD0712-090313**	ASTM D516	WETA/16017		
10241031002	**SD0713-090313**	ASTM D516	WETA/16017		
10241031003	**SD0714-090313**	ASTM D516	WETA/16017		
10241031004	**SD0715-090313**	ASTM D516	WETA/16017		
10241031005	**SD0716-090313**	ASTM D516	WETA/16017		
10241031006	**SD0717-090313**	ASTM D516	WETA/16017		
10241031007	**SD0718-090313**	ASTM D516	WETA/16017		
10241031008	**SD0719-090313**	ASTM D516	WETA/16017		
10241031009	**SD0720-090313**	ASTM D516	WETA/16017		
10241031010	**SD0721-090313**	ASTM D516	WETA/16017		
10241031011	**SD0722-090313**	ASTM D516	WETA/16017		
10241031012	**SD0723-090313**	ASTM D516	WETA/16017		
10241031013	**SD0724-090313**	ASTM D516	WETA/16017		
10241031012	**SD0723-090313**	SM 4500-Cl E	WETA/17041		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241031

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241031012	**SD0723-090313**	SM 4500-NO2 B	WETA/17023		

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1124 1159

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 1024/031

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0712-090313	9/4/2013	16:07		x			3	1		2				x	x	x								1024/031001
	SD0713-090313	9/4/2013	16:12		x			3	1		2				x	x	x								002
	SD0714-090313	9/4/2013	16:15		x			3	1		2				x	x	x								003
	SD0715-090313	9/4/2013	16:18		x			3	1		2				x	x	x								004
	SD0716-090313	9/4/2013	16:24		x			3	1		2				x	x	x								005
	SD0717-090313	9/4/2013	16:26		x			3	1		2				x	x	x								006
	SD0718-090313	9/4/2013	16:29		x			3	1		2				x	x	x								007
	SD0719-090313	9/4/2013	16:32		x			3	1		2				x	x	x								008
	SD0720-090313	9/4/2013	16:35		x			3	1		2				x	x	x								009
	SD0721-090313	9/4/2013	16:40		x			3	1		2				x	x	x								010

Sampler's Name:	Dan Cass	**Relinquished By / Affiliation**	**Date**	**Time**	**Accepted By / Affiliation**	**Date**	**Time**
Sampler's Company:	TREC INC	[signature]	9/5/13	1100A	[signature] PACE	9/6/13	0845
Shipment Method:	Fed Ex Ship Date: 9/5/2013						
Shipment Tracking No:	8006 6032 3540						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.4 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 1024 1031

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D)	TSS, SO_4								Comments
	SD0722-090313	9/4/2013	16:43		x			3	1		2				x	x	x								1024 1031 011
	SD0723-090313	9/4/2013	16:47		x			3	1		2				x	x	x								012
	SD0724-090313	9/5/2013	9:20		x			3	1		2				x	x	x								if inadequate volume, notify and skip dissolved Hg analysis. 013
	SD0725-090313	9/5/2013	9:25		x			2			2				x	x									014
	SD0726-090313	9/5/2013	9:30		x			2			2				x	x									015
	SD0727-090313	9/5/2013	9:34		x			2			2				x	x									016

Sampler's Name:	Dan Cass	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC		9/5/13	1100 A		9/6/13	845
Shipment Method:	Fed Ex Ship Date: 9/5/2013						
Shipment Tracking No:	8006 6032 3540						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BB

Project #: WO#: 10241031

10241031

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: 8006 6032 3540

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☐ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other:_____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.1 **Cooler Temp Corrected (°C):** 0.6 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.5 **Date and Initials of Person Examining Contents:** 9 6 13

Comments:

Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? 9/6/13	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-14
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1105	Temp: 0.1	Corrected Temp: 0.6	
Time: 1120	put in cooler 0.1	0.6	
Time:	Temp:	Corrected Temp:	

Project Manager Review: _____ **Date:** 9/9/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
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(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory on September 11, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request. Samples effected: 015 & 019.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10241536001	**SD0728-090713**	Water	09/09/13 11:11	09/11/13 09:40
10241536002	**SD0729-090713**	Water	09/09/13 11:18	09/11/13 09:40
10241536003	**SD0730-090713**	Water	09/09/13 11:22	09/11/13 09:40
10241536004	**SD0731-090713**	Water	09/09/13 11:26	09/11/13 09:40
10241536005	**SD0732-090713**	Water	09/09/13 11:30	09/11/13 09:40
10241536006	**SD0733-090713**	Water	09/09/13 11:35	09/11/13 09:40
10241536007	**SD0734-090713**	Water	09/09/13 11:40	09/11/13 09:40
10241536008	**SD0735-090713**	Water	09/09/13 11:45	09/11/13 09:40
10241536009	**SD0736-090713**	Water	09/09/13 11:45	09/11/13 09:40
10241536010	**SD0737-090713**	Water	09/09/13 11:49	09/11/13 09:40
10241536011	**SD0738-090713**	Water	09/09/13 11:54	09/11/13 09:40
10241536012	**SD0739-090713**	Water	09/09/13 11:58	09/11/13 09:40
10241536013	**SD0740-090713**	Water	09/09/13 12:03	09/11/13 09:40
10241536014	**SD0741-090713**	Water	09/09/13 12:06	09/11/13 09:40
10241536015	**SD0742-090713**	Water	09/09/13 12:10	09/11/13 09:40
10241536016	**SD0743-090713**	Water	09/09/13 13:11	09/11/13 09:40
10241536017	**SD0744-090713**	Water	09/09/13 13:14	09/11/13 09:40
10241536018	**SD0745-090713**	Water	09/09/13 13:18	09/11/13 09:40
10241536019	**SD0746-090713**	Water	09/09/13 13:22	09/11/13 09:40
10241536020	**SD0747-090713**	Water	09/09/13 13:28	09/11/13 09:40
10241536021	**SD0748-090713**	Water	09/09/13 13:32	09/11/13 09:40
10241536022	**SD0749-090713**	Water	09/09/13 13:36	09/11/13 09:40
10241536023	**SD0750-090713**	Water	09/09/13 13:40	09/11/13 09:40
10241536024	**SD0751-090713**	Water	09/09/13 13:46	09/11/13 09:40
10241536025	**SD0752-090713**	Water	09/09/13 13:52	09/11/13 09:40
10241536026	**SD0753-090713**	Water	09/09/13 13:52	09/11/13 09:40
10241536027	**SD0754-090713**	Water	09/09/13 13:59	09/11/13 09:40
10241536028	**SD0755-090713**	Water	09/09/13 14:03	09/11/13 09:40
10241536029	**SD0756-090713**	Water	09/09/13 14:07	09/11/13 09:40
10241536030	**SD0757-090713**	Water	09/09/13 14:11	09/11/13 09:40
10241536031	**SD0758-090713**	Water	09/09/13 15:05	09/11/13 09:40

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10241536001	**SD0728-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536002	**SD0729-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536003	**SD0730-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536004	**SD0731-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536005	**SD0732-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536006	**SD0733-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536007	**SD0734-090713**	EPA 200.8	RJS	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536008	**SD0735-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536009	**SD0736-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536010	**SD0737-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536011	**SD0738-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536012	**SD0739-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536013	**SD0740-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536014	**SD0741-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536015	**SD0742-090713**	EPA 200.8	RJS	12
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536016	**SD0743-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536017	**SD0744-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536018	**SD0745-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536019	**SD0746-090713**	EPA 200.8	RJS	12
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10241536020	**SD0747-090713**	EPA 200.8	RJS	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536021	**SD0748-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536022	**SD0749-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536023	**SD0750-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536024	**SD0751-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
10241536025	**SD0752-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536026	**SD0753-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536027	**SD0754-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536028	**SD0755-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536029	**SD0756-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10241536030	**SD0757-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10241536031	**SD0758-090713**	EPA 200.8	RJS	5
		EPA 200.8	RJS	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
31 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41806

B: Analyte was detected in the associated method blank.

- BLANK for HBN 267783 [MPRP/418 (Lab ID: 1522458)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
31 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41845

B: Analyte was detected in the associated method blank.

- BLANK for HBN 267999 [MPRP/418 (Lab ID: 1523616)
  - Copper, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
31 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/9220

B: Analyte was detected in the associated method blank.

- BLANK for HBN 267785 [MERP/922 (Lab ID: 1522469)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9311

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10241536023,10241536031

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1531537)
  - Mercury

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
31 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/9219

B: Analyte was detected in the associated method blank.

- BLANK for HBN 267784 [MERP/921 (Lab ID: 1522464)
  - Mercury, Dissolved

QC Batch: MERP/9229

B: Analyte was detected in the associated method blank.

- BLANK for HBN 268001 [MERP/922 (Lab ID: 1523627)
  - Mercury, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0746-090713 (Lab ID: 10241536019)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
31 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/32275

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1524946)
  - Total Suspended Solids
- DUP (Lab ID: 1524947)
  - Total Suspended Solids

QC Batch: WET/32276

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1524958)
  - Total Suspended Solids

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0746-090713 (Lab ID: 10241536019)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0746-090713 (Lab ID: 10241536019)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
31 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16127

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10241536022,10242923007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1534401)
  - Sulfate
- MSD (Lab ID: 1534402)
  - Sulfate

M6: Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

- MS (Lab ID: 1534403)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0746-090713 (Lab ID: 10241536019)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
1 sample was analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0746-090713 (Lab ID: 10241536019)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0728-090713 **Lab ID: 10241536001** Collected: 09/09/13 11:11 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/20/13 23:35	7440-38-2	
Cadmium	**0.00088**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/20/13 23:35	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/20/13 23:35	7440-50-8	
Lead	**0.054**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/20/13 23:35	7439-92-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	09/19/13 08:56	09/20/13 23:35	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:20	7440-38-2	
Cadmium, Dissolved	**0.00042**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:20	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:20	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:20	7439-92-1	
Zinc, Dissolved	**0.044**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:28	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 14:52	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**49.0**	mg/L	10.0	5.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.7**	mg/L	5.0	2.5	2		09/18/13 11:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0729-090713 **Lab ID: 10241536002** Collected: 09/09/13 11:18 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/20/13 23:17	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/20/13 23:17	7440-43-9	
Copper	**0.16**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/20/13 23:17	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/20/13 23:17	7439-92-1	
Zinc	**0.31**	mg/L	0.0050	0.00098	1	09/19/13 08:56	09/20/13 23:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:25	7440-38-2	
Cadmium, Dissolved	**0.00045**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:25	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:25	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:25	7439-92-1	
Zinc, Dissolved	**0.041**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000056J**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:31	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00019J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 14:54	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**78.5**	mg/L	10.0	5.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.3**	mg/L	2.5	1.2	1		09/18/13 10:59	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0730-090713 **Lab ID: 10241536003** Collected: 09/09/13 11:22 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/20/13 23:22	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/20/13 23:22	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/20/13 23:22	7440-50-8	
Lead	**0.15**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/20/13 23:22	7439-92-1	
Zinc	**0.43**	mg/L	0.0050	0.00098	1	09/19/13 08:56	09/20/13 23:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.015**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:30	7440-38-2	
Cadmium, Dissolved	**0.00056**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:30	7440-43-9	
Copper, Dissolved	**0.057**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:30	7440-50-8	
Lead, Dissolved	**0.0028**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:30	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:43	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:07	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**110**	mg/L	14.3	7.1	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.3**	mg/L	2.5	1.2	1		09/18/13 10:59	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0731-090713 **Lab ID: 10241536004** Collected: 09/09/13 11:26 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/20/13 23:26	7440-38-2	
Cadmium	**0.0020**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/20/13 23:26	7440-43-9	
Copper	**0.21**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/20/13 23:26	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/20/13 23:26	7439-92-1	
Zinc	**0.53**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:35	7440-38-2	
Cadmium, Dissolved	**0.00059**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:35	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:35	7440-50-8	
Lead, Dissolved	**0.0028**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:35	7439-92-1	
Zinc, Dissolved	**0.040**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00028**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:46	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:09	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**150**	mg/L	14.3	7.1	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.1**	mg/L	2.5	1.2	1		09/18/13 10:59	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0732-090713 **Lab ID: 10241536005** Collected: 09/09/13 11:30 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/20/13 23:31	7440-38-2	
Cadmium	**0.0020**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/20/13 23:31	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/20/13 23:31	7440-50-8	
Lead	**0.19**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/20/13 23:31	7439-92-1	
Zinc	**0.56**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:40	7440-38-2	
Cadmium, Dissolved	**0.00052**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:40	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:40	7440-50-8	
Lead, Dissolved	**0.0029**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:40	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00026**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:48	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000033J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:12	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**171**	mg/L	20.0	10.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.9**	mg/L	2.5	1.2	1		09/18/13 11:02	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0733-090713 **Lab ID: 10241536006** Collected: 09/09/13 11:35 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:10	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:10	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:10	7440-50-8	
Lead	**0.12**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:10	7439-92-1	
Zinc	**0.40**	mg/L	0.0050	0.00098	1	09/19/13 08:56	09/21/13 00:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0082**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:45	7440-38-2	
Cadmium, Dissolved	**0.00045**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:45	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:45	7440-50-8	
Lead, Dissolved	**0.0049**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:45	7439-92-1	
Zinc, Dissolved	**0.072**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00027**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:50	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000040J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:14	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**207**	mg/L	20.0	10.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.9**	mg/L	2.5	1.2	1		09/18/13 11:25	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0734-090713 **Lab ID: 10241536007** Collected: 09/09/13 11:40 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:14	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:14	7440-43-9	
Copper	**0.29**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:14	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:14	7439-92-1	
Zinc	**0.66**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:24	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0050**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:51	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:51	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:51	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:51	7439-92-1	
Zinc, Dissolved	**0.032**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00088**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:17	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**411**	mg/L	20.0	10.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.7**	mg/L	2.5	1.2	1		09/18/13 11:25	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0735-090713 **Lab ID: 10241536008** Collected: 09/09/13 11:45 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:19	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:19	7440-43-9	
Copper	**0.27**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:19	7440-50-8	
Lead	**0.089**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:19	7439-92-1	
Zinc	**0.52**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:28	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0068**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 13:56	7440-38-2	
Cadmium, Dissolved	**0.00031**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 13:56	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 13:56	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 13:56	7439-92-1	
Zinc, Dissolved	**0.062**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 13:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00025**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:55	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:19	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**563**	mg/L	20.0	10.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.5**	mg/L	2.5	1.2	1		09/18/13 11:27	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0736-090713 **Lab ID: 10241536009** Collected: 09/09/13 11:45 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:23	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:23	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:23	7440-50-8	
Lead	**0.088**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:23	7439-92-1	
Zinc	**0.52**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0067**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 14:01	7440-38-2	
Cadmium, Dissolved	**0.00031**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 14:01	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 14:01	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 14:01	7439-92-1	
Zinc, Dissolved	**0.059**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 14:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00018J**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 13:58	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:21	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**562**	mg/L	14.3	7.1	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.5**	mg/L	2.5	1.2	1		09/18/13 11:27	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0737-090713 **Lab ID: 10241536010** Collected: 09/09/13 11:49 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:28	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:28	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:28	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:28	7439-92-1	
Zinc	**0.0015J**	mg/L	0.0050	0.00098	1	09/19/13 08:56	09/21/13 00:28	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 14:44	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 14:44	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 14:44	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 14:44	7439-92-1	
Zinc, Dissolved	**0.0011J**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 14:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:00	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000030J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:24	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/14/13 14:09		D8
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/18/13 11:05	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0738-090713 **Lab ID: 10241536011** Collected: 09/09/13 11:54 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:32	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:32	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:32	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:32	7439-92-1	
Zinc	**0.62**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:51	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0091**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 14:49	7440-38-2	
Cadmium, Dissolved	**0.00033**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 14:49	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 14:49	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 14:49	7439-92-1	
Zinc, Dissolved	**0.043**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 14:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00037**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:08	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:31	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**166**	mg/L	14.3	7.1	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.8**	mg/L	2.5	1.2	1		09/18/13 11:05	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0739-090713 **Lab ID: 10241536012** Collected: 09/09/13 11:58 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:36	7440-38-2	
Cadmium	**0.0022**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:36	7440-43-9	
Copper	**0.22**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:36	7440-50-8	
Lead	**0.26**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:36	7439-92-1	
Zinc	**0.79**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 14:56	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0080**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 14:54	7440-38-2	
Cadmium, Dissolved	**0.00030**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 14:54	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 14:54	7440-50-8	
Lead, Dissolved	**0.0023**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 14:54	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 14:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00029**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:10	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**255**	mg/L	14.3	7.1	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.5**	mg/L	2.5	1.2	1		09/18/13 11:07	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0740-090713 **Lab ID: 10241536013** Collected: 09/09/13 12:03 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:40	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:40	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:40	7440-50-8	
Lead	**0.25**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:40	7439-92-1	
Zinc	**0.95**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 15:00	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0064**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:00	7440-38-2	
Cadmium, Dissolved	**0.00031**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:00	7440-43-9	
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:00	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:00	7439-92-1	
Zinc, Dissolved	**0.055**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00032**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:15	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000032J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:39	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**256**	mg/L	14.3	7.1	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.5**	mg/L	2.5	1.2	1		09/18/13 11:07	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0741-090713 **Lab ID: 10241536014** Collected: 09/09/13 12:06 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 01:07	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 01:07	7440-43-9	
Copper	**0.28**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 01:07	7440-50-8	
Lead	**0.26**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 01:07	7439-92-1	
Zinc	**0.89**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 15:05	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0061**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:05	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:05	7440-43-9	
Copper, Dissolved	**0.041**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:05	7440-50-8	
Lead, Dissolved	**0.0046**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:05	7439-92-1	
Zinc, Dissolved	**0.036**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00032**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:17	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000042J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:41	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**434**	mg/L	20.0	10.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.7**	mg/L	2.5	1.2	1		09/18/13 11:07	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0742-090713 **Lab ID: 10241536015** Collected: 09/09/13 12:10 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 01:11	7440-38-2	
Cadmium	**0.00053**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 01:11	7440-43-9	
Calcium	**17500**	ug/L	20.0	9.8	1	09/19/13 08:56	09/21/13 01:11	7440-70-2	ES
Copper	**0.095**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 01:11	7440-50-8	
Iron	**1820**	ug/L	50.0	5.9	1	09/19/13 08:56	09/21/13 01:11	7439-89-6	
Lead	**0.035**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 01:11	7439-92-1	
Magnesium	**5410**	ug/L	5.0	2.4	1	09/19/13 08:56	09/21/13 01:11	7439-95-4	
Manganese	**77.6**	ug/L	0.50	0.18	1	09/19/13 08:56	09/21/13 01:11	7439-96-5	
Potassium	**5520**	ug/L	20.0	4.7	1	09/19/13 08:56	09/21/13 01:11	7440-09-7	
Silica	**18200**	ug/L	53.5	26.8	1	09/19/13 08:56	09/21/13 01:11	7631-86-9	
Sodium	**4100**	ug/L	50.0	10.3	1	09/19/13 08:56	09/21/13 01:11	7440-23-5	
Zinc	**0.15**	mg/L	0.0050	0.00098	1	09/19/13 08:56	09/21/13 01:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0095**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:10	7440-38-2	
Cadmium, Dissolved	**0.00031**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:10	7440-43-9	
Copper, Dissolved	**0.058**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:10	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:10	7439-92-1	
Zinc, Dissolved	**0.037**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00016J**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:20	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000045J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:44	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**46.0**	mg/L	10.0	5.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.1**	mg/L	2.5	1.2	1		09/18/13 11:07	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0743-090713 **Lab ID: 10241536016** Collected: 09/09/13 13:11 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.027**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 01:15	7440-38-2	
Cadmium	**0.0022**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 01:15	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 01:15	7440-50-8	
Lead	**0.20**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 01:15	7439-92-1	
Zinc	**0.79**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 15:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0093**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:15	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:15	7440-43-9	
Copper, Dissolved	**0.041**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:15	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:15	7439-92-1	
Zinc, Dissolved	**0.042**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00032**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:27	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:51	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**248**	mg/L	20.0	10.0	1		09/14/13 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.6**	mg/L	2.5	1.2	1		09/18/13 11:07	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0744-090713 **Lab ID: 10241536017** Collected: 09/09/13 13:14 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.027**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 01:20	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 01:20	7440-43-9	
Copper	**0.24**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 01:20	7440-50-8	
Lead	**0.25**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 01:20	7439-92-1	
Zinc	**0.96**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 15:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0072**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:20	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:20	7440-43-9	
Copper, Dissolved	**0.029**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:20	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:20	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000032J**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:30	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000040J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:53	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**422**	mg/L	20.0	10.0	1		09/14/13 14:09		D8
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.3**	mg/L	2.5	1.2	1		09/18/13 11:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0745-090713 **Lab ID: 10241536018** Collected: 09/09/13 13:18 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.034**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 01:24	7440-38-2	
Cadmium	**0.0035**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 01:24	7440-43-9	
Copper	**0.32**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 01:24	7440-50-8	
Lead	**0.39**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 01:24	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/23/13 15:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0059**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:25	7440-38-2	
Cadmium, Dissolved	**0.00020**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:25	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:25	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:25	7439-92-1	
Zinc, Dissolved	**0.027**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00055**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:56	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**703**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.6**	mg/L	2.5	1.2	1		09/18/13 11:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0746-090713 **Lab ID: 10241536019** Collected: 09/09/13 13:22 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 00:45	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 00:45	7440-43-9	
Calcium	**26100**	ug/L	20.0	9.8	1	09/19/13 08:56	09/21/13 00:45	7440-70-2	
Copper	**0.22**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 00:45	7440-50-8	
Iron	**12500**	ug/L	50.0	5.9	1	09/19/13 08:56	09/21/13 00:45	7439-89-6	
Lead	**0.21**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 00:45	7439-92-1	
Magnesium	**8050**	ug/L	5.0	2.4	1	09/19/13 08:56	09/21/13 00:45	7439-95-4	
Manganese	**852**	ug/L	0.50	0.18	1	09/19/13 08:56	09/21/13 00:45	7439-96-5	
Potassium	**5620**	ug/L	20.0	4.7	1	09/19/13 08:56	09/21/13 00:45	7440-09-7	
Silica	**62100**	ug/L	53.5	26.8	1	09/19/13 08:56	09/21/13 00:45	7631-86-9	
Sodium	**4370**	ug/L	50.0	10.3	1	09/19/13 08:56	09/21/13 00:45	7440-23-5	
Zinc	**0.88**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/21/13 00:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0049**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:31	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:31	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:31	7440-50-8	
Lead, Dissolved	**0.00086**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:31	7439-92-1	
Zinc, Dissolved	**0.046**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00045**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:35	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000037J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 15:58	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**46.8**	mg/L	5.0	2.5	1		01/03/14 13:08		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**505**	mg/L	14.3	7.1	1		09/14/13 14:15		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.5**	Std. Units	0.10	0.050	1		12/31/13 14:55		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**0.55**	mg/L	0.10	0.050	1		01/03/14 12:23	14797-55-8	H1
Nitrogen, NO2 plus NO3	**0.55**	mg/L	0.10	0.050	1		01/03/14 12:23		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.6**	mg/L	2.5	1.2	1		09/18/13 11:10	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**8.0**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0746-090713 **Lab ID: 10241536019** Collected: 09/09/13 13:22 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0747-090713 **Lab ID: 10241536020** Collected: 09/09/13 13:28 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	09/19/13 08:56	09/21/13 01:29	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	09/19/13 08:56	09/21/13 01:29	7440-43-9	
Copper	**0.27**	mg/L	0.00050	0.00017	1	09/19/13 08:56	09/21/13 01:29	7440-50-8	
Lead	**0.20**	mg/L	0.00010	0.000046	1	09/19/13 08:56	09/21/13 01:29	7439-92-1	
Zinc	**0.66**	mg/L	0.025	0.0049	5	09/19/13 08:56	09/21/13 01:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0062**	mg/L	0.00050	0.000093	1	09/19/13 09:05	09/20/13 15:54	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/19/13 09:05	09/20/13 15:54	7440-43-9	
Copper, Dissolved	**0.034**	mg/L	0.00050	0.00017	1	09/19/13 09:05	09/20/13 15:54	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/19/13 09:05	09/20/13 15:54	7439-92-1	
Zinc, Dissolved	**0.018**	mg/L	0.0050	0.00098	1	09/19/13 09:05	09/20/13 15:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00037**	mg/L	0.00020	0.000030	1	09/20/13 10:03	09/20/13 14:37	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000035J**	mg/L	0.00020	0.000030	1	09/20/13 10:11	09/20/13 16:01	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**383**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.2**	mg/L	2.5	1.2	1		09/18/13 11:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0748-090713 **Lab ID: 10241536021** Collected: 09/09/13 13:32 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.032**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 16:11	7440-38-2	
Cadmium	**0.0024**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 16:11	7440-43-9	
Copper	**0.40**	mg/L	0.00050	0.00017	1	09/18/13 17:05	09/20/13 16:11	7440-50-8	
Lead	**0.28**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 16:11	7439-92-1	
Zinc	**1.1**	mg/L	0.050	0.0098	10	09/18/13 17:05	09/23/13 15:56	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0054**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:52	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:52	7440-43-9	
Copper, Dissolved	**0.034**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:52	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:52	7439-92-1	
Zinc, Dissolved	**0.026**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:52	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00057**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000090J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:30	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**596**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.6**	mg/L	2.5	1.2	1		09/18/13 14:57	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0749-090713 **Lab ID: 10241536022** Collected: 09/09/13 13:36 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 16:16	7440-38-2	
Cadmium	**0.0030**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 16:16	7440-43-9	
Copper	**0.59**	mg/L	0.0050	0.0017	10	09/18/13 17:05	09/23/13 16:00	7440-50-8	
Lead	**0.28**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 16:16	7439-92-1	
Zinc	**1.2**	mg/L	0.050	0.0098	10	09/18/13 17:05	09/23/13 16:00	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0042**	mg/L	0.0010	0.00019	2	09/18/13 17:03	09/23/13 14:10	7440-38-2	
Cadmium, Dissolved	**0.00015**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 12:52	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.0010	0.00035	2	09/18/13 17:03	09/23/13 14:10	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 12:52	7439-92-1	
Zinc, Dissolved	**0.036**	mg/L	0.010	0.0020	2	09/18/13 17:03	09/23/13 14:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00010J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:32	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**765**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**2.7**	mg/L	2.5	1.2	1		09/25/13 13:54	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0750-090713 **Lab ID: 10241536023** Collected: 09/09/13 13:40 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 16:21	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 16:21	7440-43-9	
Copper	**0.57**	mg/L	0.0050	0.0017	10	09/18/13 17:05	09/23/13 16:05	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 16:21	7439-92-1	
Zinc	**1.2**	mg/L	0.050	0.0098	10	09/18/13 17:05	09/23/13 16:05	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0034**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 12:57	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 12:57	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 12:57	7440-50-8	
Lead, Dissolved	**0.00091**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 12:57	7439-92-1	
Zinc, Dissolved	**0.077**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 12:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00044**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:22	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000060J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:42	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**848**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.1**	mg/L	2.5	1.2	1		09/18/13 15:00	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0751-090713 **Lab ID: 10241536024** Collected: 09/09/13 13:46 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 16:26	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 16:26	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	09/18/13 17:05	09/20/13 16:26	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 16:26	7439-92-1	
Zinc	**0.57**	mg/L	0.025	0.0049	5	09/18/13 17:05	09/23/13 16:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0057**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:01	7440-38-2	
Cadmium, Dissolved	**0.00028**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:01	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:01	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:01	7439-92-1	
Zinc, Dissolved	**0.040**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00060**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000070J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:45	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**251**	mg/L	14.3	7.1	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.6**	mg/L	2.5	1.2	1		09/18/13 14:57	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0752-090713 **Lab ID: 10241536025** Collected: 09/09/13 13:52 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.023**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 17:09	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:09	7440-43-9	
Copper	**0.34**	mg/L	0.00050	0.00017	1	09/18/13 17:05	09/20/13 17:09	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 17:09	7439-92-1	
Zinc	**0.56**	mg/L	0.025	0.0049	5	09/18/13 17:05	09/23/13 16:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0032**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:06	7440-38-2	
Cadmium, Dissolved	**0.000098**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:06	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:06	7440-50-8	
Lead, Dissolved	**0.00056**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:06	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:06	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00028**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:34	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000050J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:47	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**617**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**1.6J**	mg/L	2.5	1.2	1		09/25/13 13:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0753-090713 **Lab ID: 10241536026** Collected: 09/09/13 13:52 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.023**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 17:14	7440-38-2	
Cadmium	**0.0020**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:14	7440-43-9	
Copper	**0.35**	mg/L	0.00050	0.00017	1	09/18/13 17:05	09/20/13 17:14	7440-50-8	
Lead	**0.15**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 17:14	7439-92-1	
Zinc	**0.83**	mg/L	0.025	0.0049	5	09/18/13 17:05	09/23/13 16:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0031**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:30	7440-38-2	
Cadmium, Dissolved	**0.00011**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:30	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:30	7440-50-8	
Lead, Dissolved	**0.00058**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:30	7439-92-1	
Zinc, Dissolved	**0.016**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00025**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000070J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:49	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**586**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**1.9J**	mg/L	2.5	1.2	1		09/25/13 13:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0754-090713 **Lab ID: 10241536027** Collected: 09/09/13 13:59 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 17:19	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:19	7440-43-9	
Copper	**0.00042J**	mg/L	0.00050	0.00017	1	09/18/13 17:05	09/20/13 17:19	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 17:19	7439-92-1	
Zinc	ND	mg/L	0.0050	0.00098	1	09/18/13 17:05	09/20/13 17:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:34	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:34	7440-43-9	
Copper, Dissolved	**0.00030J**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:34	7440-50-8	B
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:34	7439-92-1	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000040J**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:38	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000050J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:51	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/25/13 13:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0755-090713 **Lab ID: 10241536028** Collected: 09/09/13 14:03 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.068**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 17:23	7440-38-2	
Cadmium	**0.0070**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:23	7440-43-9	
Copper	**0.68**	mg/L	0.0050	0.0017	10	09/18/13 17:05	09/23/13 16:24	7440-50-8	
Lead	**0.56**	mg/L	0.0010	0.00046	10	09/18/13 17:05	09/23/13 16:24	7439-92-1	
Zinc	**3.0**	mg/L	0.050	0.0098	10	09/18/13 17:05	09/23/13 16:24	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:39	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:39	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:39	7440-50-8	
Lead, Dissolved	**0.00096**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:39	7439-92-1	
Zinc, Dissolved	**0.042**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:40	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000080J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:53	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**912**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.4**	mg/L	2.5	1.2	1		09/18/13 15:00	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0756-090713 **Lab ID: 10241536029** Collected: 09/09/13 14:07 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.051**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 17:28	7440-38-2	
Cadmium	**0.0057**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:28	7440-43-9	
Copper	**0.52**	mg/L	0.0050	0.0017	10	09/18/13 17:05	09/23/13 16:28	7440-50-8	
Lead	**0.41**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 17:28	7439-92-1	
Zinc	**2.3**	mg/L	0.050	0.0098	10	09/18/13 17:05	09/23/13 16:28	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0072**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:43	7440-38-2	
Cadmium, Dissolved	**0.00015**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:43	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:43	7440-50-8	
Lead, Dissolved	**0.00082**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:43	7439-92-1	
Zinc, Dissolved	**0.030**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00066**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:42	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000060J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 12:59	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1110**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.6**	mg/L	2.5	1.2	1		09/18/13 15:00	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0757-090713 **Lab ID: 10241536030** Collected: 09/09/13 14:11 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.0050	0.00093	10	09/18/13 17:05	09/23/13 16:33	7440-38-2	
Cadmium	**0.0031**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:33	7440-43-9	
Copper	**0.29**	mg/L	0.0050	0.0017	10	09/18/13 17:05	09/23/13 16:33	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	09/18/13 17:05	09/20/13 17:33	7439-92-1	
Zinc	**1.2**	mg/L	0.050	0.0098	10	09/18/13 17:05	09/23/13 16:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0038**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 13:48	7440-38-2	
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 13:48	7440-43-9	
Copper, Dissolved	**0.031**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 13:48	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 13:48	7439-92-1	
Zinc, Dissolved	**0.046**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 13:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00030**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:49	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000060J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 13:01	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**527**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.3**	mg/L	2.5	1.2	1		09/18/13 15:00	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Sample: SD0758-090713 **Lab ID: 10241536031** Collected: 09/09/13 15:05 Received: 09/11/13 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.14**	mg/L	0.00050	0.000093	1	09/18/13 17:05	09/20/13 17:38	7440-38-2	
Cadmium	**0.013**	mg/L	0.000080	0.000032	1	09/18/13 17:05	09/20/13 17:38	7440-43-9	
Copper	**1.7**	mg/L	0.010	0.0035	20	09/18/13 17:05	09/23/13 16:51	7440-50-8	
Lead	**1.1**	mg/L	0.0020	0.00092	20	09/18/13 17:05	09/23/13 16:51	7439-92-1	
Zinc	**3.1**	mg/L	0.10	0.020	20	09/18/13 17:05	09/23/13 16:51	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.016**	mg/L	0.00050	0.000093	1	09/18/13 17:03	09/20/13 14:30	7440-38-2	
Cadmium, Dissolved	**0.000073J**	mg/L	0.000080	0.000032	1	09/18/13 17:03	09/20/13 14:30	7440-43-9	
Copper, Dissolved	**0.014**	mg/L	0.00050	0.00017	1	09/18/13 17:03	09/20/13 14:30	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	09/18/13 17:03	09/20/13 14:30	7439-92-1	
Zinc, Dissolved	**0.014**	mg/L	0.0050	0.00098	1	09/18/13 17:03	09/20/13 14:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	09/22/13 09:28	09/23/13 13:51	7439-97-6	M1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000070J**	mg/L	0.00020	0.000030	1	09/20/13 14:32	09/23/13 13:03	7439-97-6	B
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1560**	mg/L	20.0	10.0	1		09/14/13 14:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.3**	mg/L	2.5	1.2	1		09/18/13 15:00	14808-79-8	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MERP/9220 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

METHOD BLANK: 1522469 — Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000042J	0.00020	09/20/13 13:23	

LABORATORY CONTROL SAMPLE: 1522470

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522471 1522472

Parameter	Units	10241536002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000056J	.005	.005	0.0053	0.0051	105	101	85-115	4	20	

MATRIX SPIKE SAMPLE: 1522473

Parameter	Units	10241536012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00029	.005	0.0051	97	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MERP/9311 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

METHOD BLANK: 1530435 Matrix: Water
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/23/13 13:13	

LABORATORY CONTROL SAMPLE: 1530436

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1530437 1530438

Parameter	Units	10241536023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00044	.005	.005	0.0054	0.0050	100	92	85-115	8	20	

MATRIX SPIKE SAMPLE: 1531537

Parameter	Units	10241536031 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0013	.005	0.0054	83	85-115	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MERP/9219 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

METHOD BLANK: 1522464 — Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	0.000065J	0.00020	09/20/13 14:47	

LABORATORY CONTROL SAMPLE: 1522465

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522466 1522467

Parameter	Units	10241536002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	0.00019 J	.005	.005	0.0052	0.0053	99	102	85-115	2	20	

MATRIX SPIKE SAMPLE: 1522468

Parameter	Units	10241536012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0049	98	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MERP/9229 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

METHOD BLANK: 1523627 — Matrix: Water
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	0.000080J	0.00020	09/23/13 12:26	

LABORATORY CONTROL SAMPLE: 1523628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0048	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523629 1523630

Parameter	Units	10241536022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	0.00010 J	.005	.005	0.0046	0.0047	90	92	85-115	2	20	

MATRIX SPIKE SAMPLE: 1523631

Parameter	Units	10241536031 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	0.000070J	.005	0.0050	99	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MPRP/41806 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

METHOD BLANK: 1522458 Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/20/13 23:13	
Cadmium	mg/L	ND	0.000080	09/20/13 23:13	
Calcium	ug/L	ND	20.0	09/20/13 23:13	ES
Copper	mg/L	ND	0.00050	09/20/13 23:13	
Iron	ug/L	7.6J	50.0	09/20/13 23:13	
Lead	mg/L	ND	0.00010	09/20/13 23:13	
Magnesium	ug/L	ND	5.0	09/20/13 23:13	
Manganese	ug/L	ND	0.50	09/20/13 23:13	
Potassium	ug/L	ND	20.0	09/20/13 23:13	
Sodium	ug/L	ND	50.0	09/20/13 23:13	
Zinc	mg/L	0.0011J	0.0050	09/20/13 23:13	

LABORATORY CONTROL SAMPLE: 1522459

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.080	101	85-115	
Cadmium	mg/L	.08	0.080	101	85-115	
Calcium	ug/L	1000	931	93	85-115	ES
Copper	mg/L	.08	0.079	99	85-115	
Iron	ug/L	1000	1080	108	85-115	
Lead	mg/L	.08	0.082	103	85-115	
Magnesium	ug/L	1000	1020	102	85-115	
Manganese	ug/L	80	81.9	102	85-115	
Potassium	ug/L	1000	1000	100	85-115	
Sodium	ug/L	1000	960	96	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522460 1522461

Parameter	Units	10241536001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.019	.08	.08	0.098	0.098	98	98	70-130	.04	20	
Cadmium	mg/L	0.00088	.08	.08	0.080	0.080	99	98	70-130	.9	20	
Calcium	ug/L		1000	1000	32200	32300	85	95	70-130	.3	20	ES
Copper	mg/L	0.12	.08	.08	0.19	0.19	95	95	70-130	.04	20	
Iron	ug/L		1000	1000	3640	3640	120	120	70-130	.2	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522460 1522461

Parameter	Units	10241536001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.054	.08	.08	0.14	0.14	104	105	70-130	.3	20	
Magnesium	ug/L		1000	1000	10600	10600	93	93	70-130	.02	20	
Manganese	ug/L		80	80	231	232	102	103	70-130	.5	20	
Potassium	ug/L		1000	1000	6270	6310	103	106	70-130	.6	20	
Sodium	ug/L		1000	1000	9600	9660	-26	-19	70-130	.7	20	
Zinc	mg/L	0.20	.08	.08	0.28	0.28	98	96	70-130	.4	20	

MATRIX SPIKE SAMPLE: 1522462

Parameter	Units	10241536020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.025	.08	0.10	97	70-130	
Cadmium	mg/L	0.0018	.08	0.081	99	70-130	
Calcium	ug/L		1000	27700	137	70-130	ES
Copper	mg/L	0.27	.08	0.35	106	70-130	
Iron	ug/L		1000	12800	188	70-130	
Lead	mg/L	0.20	.08	0.29	110	70-130	
Magnesium	ug/L		1000	9230	138	70-130	
Manganese	ug/L		80	581	111	70-130	
Potassium	ug/L		1000	6560	130	70-130	
Sodium	ug/L		1000	5290	115	70-130	
Zinc	mg/L	0.66	.08	0.75	113	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MPRP/41844 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

METHOD BLANK: 1523610 — Matrix: Water
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/20/13 16:07	
Cadmium	mg/L	ND	0.000080	09/20/13 16:07	
Copper	mg/L	ND	0.00050	09/20/13 16:07	
Lead	mg/L	ND	0.00010	09/20/13 16:07	
Zinc	mg/L	ND	0.0050	09/20/13 16:07	

LABORATORY CONTROL SAMPLE: 1523611

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.081	102	85-115	
Cadmium	mg/L	.08	0.082	103	85-115	
Copper	mg/L	.08	0.086	108	85-115	
Lead	mg/L	.08	0.078	98	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523612 1523613

Parameter	Units	10241533001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.015	.08	.08	0.10	0.11	110	115	70-130	3	20	
Cadmium	mg/L	0.00050	.08	.08	0.091	0.096	113	119	70-130	5	20	
Copper	mg/L	0.037	.08	.08	0.13	0.13	114	121	70-130	4	20	
Lead	mg/L	0.020	.08	.08	0.11	0.12	115	121	70-130	4	20	
Zinc	mg/L	0.19	.08	.08	0.28	0.29	110	122	70-130	3	20	

MATRIX SPIKE SAMPLE: 1523614

Parameter	Units	10241735005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	3.0 ug/L	.08	0.082	99	70-130	
Cadmium	mg/L	ND	.08	0.081	101	70-130	
Copper	mg/L	1.0 ug/L	.08	0.083	103	70-130	
Lead	mg/L	0.32 ug/L	.08	0.082	102	70-130	
Zinc	mg/L	3.6J ug/L	.08	0.083	100	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MPRP/41805 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

METHOD BLANK: 1522453 — Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/20/13 13:15	
Cadmium, Dissolved	mg/L	ND	0.000080	09/20/13 13:15	
Copper, Dissolved	mg/L	ND	0.00050	09/20/13 13:15	
Lead, Dissolved	mg/L	ND	0.00010	09/20/13 13:15	
Zinc, Dissolved	mg/L	ND	0.0050	09/20/13 13:15	

LABORATORY CONTROL SAMPLE: 1522454

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.083	104	85-115	
Cadmium, Dissolved	mg/L	.08	0.081	102	85-115	
Copper, Dissolved	mg/L	.08	0.084	105	85-115	
Lead, Dissolved	mg/L	.08	0.085	106	85-115	
Zinc, Dissolved	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1522455 1522456

Parameter	Units	10241536001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.013	.08	.08	0.097	0.096	104	103	70-130	.9	20	
Cadmium, Dissolved	mg/L	0.00042	.08	.08	0.082	0.080	101	100	70-130	1	20	
Copper, Dissolved	mg/L	0.051	.08	.08	0.13	0.13	101	102	70-130	.4	20	
Lead, Dissolved	mg/L	0.0016	.08	.08	0.084	0.084	104	103	70-130	.2	20	
Zinc, Dissolved	mg/L	0.044	.08	.08	0.12	0.12	101	100	70-130	.1	20	

MATRIX SPIKE SAMPLE: 1522457

Parameter	Units	10241536020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0062	.08	0.088	103	70-130	
Cadmium, Dissolved	mg/L	0.00018	.08	0.081	101	70-130	
Copper, Dissolved	mg/L	0.034	.08	0.12	103	70-130	
Lead, Dissolved	mg/L	0.0013	.08	0.084	103	70-130	
Zinc, Dissolved	mg/L	0.018	.08	0.099	100	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: MPRP/41845 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

METHOD BLANK: 1523616 — Matrix: Water
Associated Lab Samples: 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/20/13 12:29	
Cadmium, Dissolved	mg/L	ND	0.000080	09/20/13 12:29	
Copper, Dissolved	mg/L	0.00018J	0.00050	09/20/13 12:29	
Lead, Dissolved	mg/L	ND	0.00010	09/20/13 12:29	
Zinc, Dissolved	mg/L	ND	0.0050	09/20/13 12:29	

LABORATORY CONTROL SAMPLE: 1523617

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.080	100	85-115	
Cadmium, Dissolved	mg/L	.08	0.081	101	85-115	
Copper, Dissolved	mg/L	.08	0.083	104	85-115	
Lead, Dissolved	mg/L	.08	0.078	97	85-115	
Zinc, Dissolved	mg/L	.08	0.081	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1523618 1523619

Parameter	Units	10241536021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0054	.08	.08	0.086	0.085	101	99	70-130	2	20	
Cadmium, Dissolved	mg/L	0.00019	.08	.08	0.083	0.080	104	100	70-130	4	20	
Copper, Dissolved	mg/L	0.034	.08	.08	0.12	0.12	106	102	70-130	3	20	
Lead, Dissolved	mg/L	0.0018	.08	.08	0.080	0.078	98	95	70-130	3	20	
Zinc, Dissolved	mg/L	0.026	.08	.08	0.11	0.11	106	103	70-130	2	20	

MATRIX SPIKE SAMPLE: 1523620

Parameter	Units	10241735005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	2.6 ug/L	.08	0.083	101	70-130	
Cadmium, Dissolved	mg/L	ND	.08	0.081	101	70-130	
Copper, Dissolved	mg/L	1.1 ug/L	.08	0.084	103	70-130	
Lead, Dissolved	mg/L	ND	.08	0.078	98	70-130	
Zinc, Dissolved	mg/L	ND	.08	0.083	103	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WET/33876 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10241536019

METHOD BLANK: 1604009 | Matrix: Water
Associated Lab Samples: 10241536019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WET/32275 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017

METHOD BLANK: 1524944 — Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/14/13 14:09	

METHOD BLANK: 1524948 — Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/14/13 14:09	

LABORATORY CONTROL SAMPLE: 1524945

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	95.2	95	80-120	

SAMPLE DUPLICATE: 1524946

Parameter	Units	10241290001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	D8

SAMPLE DUPLICATE: 1524947

Parameter	Units	10241536017 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	422	ND		10	D8

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WET/32276 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10241536018, 10241536019, 10241536020, 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

METHOD BLANK: 1524955 Matrix: Water
Associated Lab Samples: 10241536018, 10241536019, 10241536020, 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/14/13 14:15	

METHOD BLANK: 1524959 Matrix: Water
Associated Lab Samples: 10241536018, 10241536019, 10241536020, 10241536021, 10241536022, 10241536023, 10241536024, 10241536025, 10241536026, 10241536027, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/14/13 14:15	

LABORATORY CONTROL SAMPLE: 1524956

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	81.0	81	80-120	

SAMPLE DUPLICATE: 1524957

Parameter	Units	10241536018 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	703	705	.3	10	

SAMPLE DUPLICATE: 1524958

Parameter	Units	10241685020 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	23.2	19.0	20	10	D8

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WET/33849
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 10241536019

LABORATORY CONTROL SAMPLE: 1603269

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	100	98-102	H6

SAMPLE DUPLICATE: 1603270

Parameter	Units	10237680008 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.7	6.7	.3	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WETA/17057
QC Batch Method: SM 4500-NO3 H
Analysis Method: SM 4500-NO3 H
Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10241536019

METHOD BLANK: 1604003
Matrix: Water
Associated Lab Samples: 10241536019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WETA/16054 | Analysis Method: ASTM D516
QC Batch Method: ASTM D516 | Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

METHOD BLANK: 1527198 | Matrix: Water
Associated Lab Samples: 10241536001, 10241536002, 10241536003, 10241536004, 10241536005, 10241536006, 10241536007, 10241536008, 10241536009, 10241536010, 10241536011, 10241536012, 10241536013, 10241536014, 10241536015, 10241536016, 10241536017, 10241536018, 10241536019, 10241536020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/18/13 11:25	

LABORATORY CONTROL SAMPLE: 1527199

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527200 1527201

Parameter	Units	10241536001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	29.7	20	20	50.1	50.0	102	101	80-120	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527202 1527203

Parameter	Units	10241536011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	14.8	20	20	32.9	32.6	91	89	80-120	.8	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WETA/16055 Analysis Method: ASTM D516
QC Batch Method: ASTM D516 Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10241536021, 10241536023, 10241536024, 10241536028, 10241536029, 10241536030, 10241536031

METHOD BLANK: 1527294 Matrix: Water
Associated Lab Samples: 10241536021, 10241536023, 10241536024, 10241536028, 10241536029, 10241536030, 10241536031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/18/13 14:57	

LABORATORY CONTROL SAMPLE: 1527295

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527296 1527297

Parameter	Units	10241536021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	5.6	20	20	26.3	26.7	103	106	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527298 1527299

Parameter	Units	10241536031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	11.3	20	20	30.6	30.5	97	96	80-120	.07	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WETA/16127 Analysis Method: ASTM D516
QC Batch Method: ASTM D516 Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10241536022, 10241536025, 10241536026, 10241536027

METHOD BLANK: 1534399 Matrix: Water
Associated Lab Samples: 10241536022, 10241536025, 10241536026, 10241536027

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/25/13 13:53	

LABORATORY CONTROL SAMPLE: 1534400

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.2	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534401 1534402

Parameter	Units	10241536022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	2.7	20	20	27.1	27.2	122	122	80-120	.1	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534403 1534404

Parameter	Units	10242923007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	270	20	20	277	286	38	80	80-120	3	30	M6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WETA/17041
QC Batch Method: SM 4500-Cl E
Analysis Method: SM 4500-Cl E
Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10241536019

METHOD BLANK: 1603873
Matrix: Water
Associated Lab Samples: 10241536019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

QC Batch: WETA/17023
QC Batch Method: SM 4500-NO2 B
Analysis Method: SM 4500-NO2 B
Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10241536019

METHOD BLANK: 1603178
Matrix: Water
Associated Lab Samples: 10241536019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
ES	The reported result is estimated because one or more of the constituent results are qualified as such.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241536001	**SD0728-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536002	**SD0729-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536003	**SD0730-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536004	**SD0731-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536005	**SD0732-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536006	**SD0733-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536007	**SD0734-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536008	**SD0735-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536009	**SD0736-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536010	**SD0737-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536011	**SD0738-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536012	**SD0739-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536013	**SD0740-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536014	**SD0741-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536015	**SD0742-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536016	**SD0743-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536017	**SD0744-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536018	**SD0745-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536019	**SD0746-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536020	**SD0747-090713**	EPA 200.8	MPRP/41806	EPA 200.8	ICPM/17661
10241536021	**SD0748-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536022	**SD0749-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536023	**SD0750-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536024	**SD0751-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536025	**SD0752-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536026	**SD0753-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536027	**SD0754-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536028	**SD0755-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536029	**SD0756-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536030	**SD0757-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536031	**SD0758-090713**	EPA 200.8	MPRP/41844	EPA 200.8	ICPM/17658
10241536001	**SD0728-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536002	**SD0729-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536003	**SD0730-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536004	**SD0731-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536005	**SD0732-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536006	**SD0733-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536007	**SD0734-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536008	**SD0735-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536009	**SD0736-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536010	**SD0737-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536011	**SD0738-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536012	**SD0739-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536013	**SD0740-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536014	**SD0741-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536015	**SD0742-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536016	**SD0743-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536017	**SD0744-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241536018	**SD0745-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536019	**SD0746-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536020	**SD0747-090713**	EPA 200.8	MPRP/41805	EPA 200.8	ICPM/17660
10241536021	**SD0748-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536022	**SD0749-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536023	**SD0750-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536024	**SD0751-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536025	**SD0752-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536026	**SD0753-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536027	**SD0754-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536028	**SD0755-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536029	**SD0756-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536030	**SD0757-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536031	**SD0758-090713**	EPA 200.8	MPRP/41845	EPA 200.8	ICPM/17657
10241536001	**SD0728-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536002	**SD0729-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536003	**SD0730-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536004	**SD0731-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536005	**SD0732-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536006	**SD0733-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536007	**SD0734-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536008	**SD0735-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536009	**SD0736-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536010	**SD0737-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536011	**SD0738-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536012	**SD0739-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536013	**SD0740-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536014	**SD0741-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536015	**SD0742-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536016	**SD0743-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536017	**SD0744-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536018	**SD0745-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536019	**SD0746-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536020	**SD0747-090713**	EPA 245.1	MERP/9220	EPA 245.1	MERC/10592
10241536021	**SD0748-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536022	**SD0749-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536023	**SD0750-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536024	**SD0751-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536025	**SD0752-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536026	**SD0753-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536027	**SD0754-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536028	**SD0755-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536029	**SD0756-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536030	**SD0757-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536031	**SD0758-090713**	EPA 245.1	MERP/9311	EPA 245.1	MERC/10602
10241536001	**SD0728-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536002	**SD0729-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241536003	**SD0730-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536004	**SD0731-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536005	**SD0732-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536006	**SD0733-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536007	**SD0734-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536008	**SD0735-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536009	**SD0736-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536010	**SD0737-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536011	**SD0738-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536012	**SD0739-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536013	**SD0740-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536014	**SD0741-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536015	**SD0742-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536016	**SD0743-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536017	**SD0744-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536018	**SD0745-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536019	**SD0746-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536020	**SD0747-090713**	EPA 245.1	MERP/9219	EPA 245.1	MERC/10593
10241536021	**SD0748-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536022	**SD0749-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536023	**SD0750-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536024	**SD0751-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536025	**SD0752-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536026	**SD0753-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536027	**SD0754-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536028	**SD0755-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536029	**SD0756-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536030	**SD0757-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536031	**SD0758-090713**	EPA 245.1	MERP/9229	EPA 245.1	MERC/10597
10241536019	**SD0746-090713**	SM 2320B	WET/33876		
10241536001	**SD0728-090713**	SM 2540D	WET/32275		
10241536002	**SD0729-090713**	SM 2540D	WET/32275		
10241536003	**SD0730-090713**	SM 2540D	WET/32275		
10241536004	**SD0731-090713**	SM 2540D	WET/32275		
10241536005	**SD0732-090713**	SM 2540D	WET/32275		
10241536006	**SD0733-090713**	SM 2540D	WET/32275		
10241536007	**SD0734-090713**	SM 2540D	WET/32275		
10241536008	**SD0735-090713**	SM 2540D	WET/32275		
10241536009	**SD0736-090713**	SM 2540D	WET/32275		
10241536010	**SD0737-090713**	SM 2540D	WET/32275		
10241536011	**SD0738-090713**	SM 2540D	WET/32275		
10241536012	**SD0739-090713**	SM 2540D	WET/32275		
10241536013	**SD0740-090713**	SM 2540D	WET/32275		
10241536014	**SD0741-090713**	SM 2540D	WET/32275		
10241536015	**SD0742-090713**	SM 2540D	WET/32275		
10241536016	**SD0743-090713**	SM 2540D	WET/32275		
10241536017	**SD0744-090713**	SM 2540D	WET/32275		

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241536018	**SD0745-090713**	SM 2540D	WET/32276		
10241536019	**SD0746-090713**	SM 2540D	WET/32276		
10241536020	**SD0747-090713**	SM 2540D	WET/32276		
10241536021	**SD0748-090713**	SM 2540D	WET/32276		
10241536022	**SD0749-090713**	SM 2540D	WET/32276		
10241536023	**SD0750-090713**	SM 2540D	WET/32276		
10241536024	**SD0751-090713**	SM 2540D	WET/32276		
10241536025	**SD0752-090713**	SM 2540D	WET/32276		
10241536026	**SD0753-090713**	SM 2540D	WET/32276		
10241536027	**SD0754-090713**	SM 2540D	WET/32276		
10241536028	**SD0755-090713**	SM 2540D	WET/32276		
10241536029	**SD0756-090713**	SM 2540D	WET/32276		
10241536030	**SD0757-090713**	SM 2540D	WET/32276		
10241536031	**SD0758-090713**	SM 2540D	WET/32276		
10241536019	**SD0746-090713**	SM 4500-H+B	WET/33849		
10241536019	**SD0746-090713**	SM 4500-NO3 H	WETA/17057		
10241536001	**SD0728-090713**	ASTM D516	WETA/16054		
10241536002	**SD0729-090713**	ASTM D516	WETA/16054		
10241536003	**SD0730-090713**	ASTM D516	WETA/16054		
10241536004	**SD0731-090713**	ASTM D516	WETA/16054		
10241536005	**SD0732-090713**	ASTM D516	WETA/16054		
10241536006	**SD0733-090713**	ASTM D516	WETA/16054		
10241536007	**SD0734-090713**	ASTM D516	WETA/16054		
10241536008	**SD0735-090713**	ASTM D516	WETA/16054		
10241536009	**SD0736-090713**	ASTM D516	WETA/16054		
10241536010	**SD0737-090713**	ASTM D516	WETA/16054		
10241536011	**SD0738-090713**	ASTM D516	WETA/16054		
10241536012	**SD0739-090713**	ASTM D516	WETA/16054		
10241536013	**SD0740-090713**	ASTM D516	WETA/16054		
10241536014	**SD0741-090713**	ASTM D516	WETA/16054		
10241536015	**SD0742-090713**	ASTM D516	WETA/16054		
10241536016	**SD0743-090713**	ASTM D516	WETA/16054		
10241536017	**SD0744-090713**	ASTM D516	WETA/16054		
10241536018	**SD0745-090713**	ASTM D516	WETA/16054		
10241536019	**SD0746-090713**	ASTM D516	WETA/16054		
10241536020	**SD0747-090713**	ASTM D516	WETA/16054		
10241536021	**SD0748-090713**	ASTM D516	WETA/16055		
10241536022	**SD0749-090713**	ASTM D516	WETA/16127		
10241536023	**SD0750-090713**	ASTM D516	WETA/16055		
10241536024	**SD0751-090713**	ASTM D516	WETA/16055		
10241536025	**SD0752-090713**	ASTM D516	WETA/16127		
10241536026	**SD0753-090713**	ASTM D516	WETA/16127		
10241536027	**SD0754-090713**	ASTM D516	WETA/16127		
10241536028	**SD0755-090713**	ASTM D516	WETA/16055		
10241536029	**SD0756-090713**	ASTM D516	WETA/16055		

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10241536

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10241536030	**SD0757-090713**	ASTM D516	WETA/16055		
10241536031	**SD0758-090713**	ASTM D516	WETA/16055		
10241536019	**SD0746-090713**	SM 4500-Cl E	WETA/17041		
10241536019	**SD0746-090713**	SM 4500-NO2 B	WETA/17023		

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1151, 53, 54, 55, 50, 58

10241536

BP Remediation Management COC - Effective Dates: August 23, 2011- June 30, 2012

BP LaMP COC Rev. 7, Aug 23, 2011

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:
Req Due Date (mm/dd/yy):
Rush TAT: Yes ____ No x
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0728-090713	9/9/2013	11:11		x			3	1		2				x	x	x								001
	SD0729-090713	9/9/2013	11:18		x			3	1		2				x	x	x								002
	SD0730-090713	9/9/2013	11:22		x			3	1		2				x	x	x								003
	SD0731-090713	9/9/2013	11:26		x			3	1		2				x	x	x								004
	SD0732-090713	9/9/2013	11:30		x			3	1		2				x	x	x								005
	SD0733-090713	9/9/2013	11:35		x			3	1		2				x	x	x								006
	SD0734-090713	9/9/2013	11:40		x			3	1		2				x	x	x								007
	SD0735-090713	9/9/2013	11:45		x			3	1		2				x	x	x								008
	SD0736-090713	9/9/2013	11:45		x			3	1		2				x	x	x								009
	SD0737-090713	9/9/2013	11:49		x			3	1		2				x	x	x								010

Sampler's Name:	Paddy Stoy	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	Stoy TREC	9/10/13	1000	[illegible]	9/11/13	940
Shipment Method:	Fed Ex Ship Date: 9/10/2013						
Shipment Tracking No:	5753 4191 5350; 5753 4191 5361, 5753-4191-5372, 5753-4191-5383				T=2.4 2.8 5.5 5.8		

Special Instructions:

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No x

Lab Work Order Number:

Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0738-090713	9/9/2013	11:54		x			3	1		2				x	x	x								011
	SD0739-090713	9/9/2013	11:58		x			3	1		2				x	x	x								012
	SD0740-090313	9/9/2013	12:03		x			3	1		2				x	x	x								013
	SD0741-090713	9/9/2013	12:06		x			3	1		2				x	x	x								014
	SD0742-090713	9/9/2013	12:10		x			3	1		2				x	x	x								015
	SD0743-090713	9/9/2013	13:11		x			3	1		2				x	x	x								016
	SD0744-090713	9/9/2013	13:14		x			3	1		2				x	x	x								017
	SD0745-090713	9/9/2013	13:18		x			3	1		2				x	x	x								018
	SD0746-090713	9/9/2013	13:22		x			3	1		2				x	x	x								019
	SD0747-090713	9/9/2013	13:28		x			3	1		2				x	x	x								020

Sampler's Name:	Paddy Stoy	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	[illegible] / TREC	09/10/13	1000	[illegible] PACE	9/11/13	940
Shipment Method:	Fed Ex Ship Date: 9/10/2013						
Shipment Tracking No:	5753 4191 5350; 5753 4191 5361 " " 5372 " " 5383				T=2.4 2.8 5.5 5.8		

Special Instructions:

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No x
Lab Work Order Number:
Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		Requested Analyses: As(T), Cd(T), Cu(T), Pb(T), Hg(T), Zn(T)	As(D), Cd(D), Cu(D), Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0748-090713	9/9/2013	13:32		x			3	1		2				x	x	x								021
	SD0749-090713	9/9/2013	13:36		x			3	1		2				x	x	x								022
	SD0750-090713	9/9/2013	13:40		x			3	1		2				x	x	x								023
	SD0751-090713	9/9/2013	13:46		x			3	1		2				x	x	x								024
	SD0752-090713	9/9/2013	13:52		x			3	1		2				x	x	x								025
	SD0753-090713	9/9/2013	13:52		x			3	1		2				x	x	x								026
	SD0754-090713	9/9/2013	13:59		x			3	1		2				x	x	x								027
	SD0755-090713	9/9/2013	14:03		x			3	1		2				x	x	x								028
	SD0756-090713	9/9/2013	14:07		x			3	1		2				x	x	x								029
	SD0757-090713	9/9/2013	14:11		x			3	1		2				x	x	x								030

Sampler's Name:	Paddy Stoy	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	[illegible] / TREC	9/10/13	1020	[illegible] PACE	9/11/13	940
Shipment Method:	Fed Ex Ship Date: 9/10/2013				T=2.4 2.8 5.5 5.8		
Shipment Tracking No:	5753 4191 5350; 5753 4191 5361						

Special Instructions: 5753 4191 5372, 5753 4191 5383

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No x

Lab Work Order Number:

Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0758-090713	9/9/2013	15:05		x			3	1		2				x	x	x								31

Sampler's Name:	Paddy Stoy	**Relinquished By / Affiliation**	**Date**	**Time**	**Accepted By / Affiliation**	**Date**	**Time**
Sampler's Company:	TREC INC	[illegible] / TREC	9/10/13	1000	[illegible]	9/11/13	940
Shipment Method:	Fed Ex Ship Date: 9/10/2013						
Shipment Tracking No:	5753 4191 5350; 5753 4191 5361				T=24 2.8 5.5 5.7		

Special Instructions: 5753 4191 5372, 5753 4191 5383

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10241536

10241536

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: 5753419153724/5361/6383/6360

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other:_____ **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.9/2.3/5.0/5.3 **Cooler Temp Corrected (°C):** 2.4/2.8/5.5/5.8 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.5 **Date and Initials of Person Examining Contents:** AWC 9 11 13

Comments:

Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-31 2/2
Per method, VOA pH is checked after analysis				Initial when completed: AWC Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1150	Temp: 1.9/2.3/5.0/5.3	Corrected Temp:	2.4/2.8/5.5/5.8
Time: 1210	put in cooler: 1.9/2.3/5.0/5.3	Corrected Temp:	2.4/2.8/5.5/5.8
Time:	Temp:	Corrected Temp:	

Project Manager Review: _____ **Date:** 9/11/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

September 30, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10242261

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 17, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10242261

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10242261

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10242261001	**LAO-SS-1-091213**	Water	09/12/13 10:20	09/17/13 08:53
10242261002	**LAO-SS-1-091613**	Water	09/16/13 14:15	09/17/13 08:53
10242261003	**LAO-SS-2-091613**	Water	09/16/13 14:23	09/17/13 08:53

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10242261

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10242261001	**LAO-SS-1-091213**	EPA 200.8	RB1	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10242261002	**LAO-SS-1-091613**	EPA 200.8	RB1	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10242261003	**LAO-SS-2-091613**	EPA 200.8	RB1	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10242261

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 30, 2013

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: MPRP/41948

B: Analyte was detected in the associated method blank.

- BLANK for HBN 268760 [MPRP/419 (Lab ID: 1528015)
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41948

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242261001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1528017)
  - Calcium
  - Magnesium
  - Silver
- MSD (Lab ID: 1528018)
  - Calcium
  - Magnesium
  - Silver

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10242261

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 30, 2013

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41948

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1528017)
  - Calcium
- MSD (Lab ID: 1528018)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10242261

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 30, 2013

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10242261

Sample: LAO-SS-1-091213 **Lab ID: 10242261001** Collected: 09/12/13 10:20 Received: 09/17/13 08:53 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.011**	mg/L	0.0040	0.0015	1	09/21/13 09:22	09/24/13 14:44	7429-90-5	
Arsenic	**0.0067**	mg/L	0.00050	0.000093	1	09/21/13 09:22	09/24/13 14:44	7440-38-2	
Cadmium	**0.00026**	mg/L	0.000080	0.000032	1	09/21/13 09:22	09/24/13 14:44	7440-43-9	
Calcium	**116**	mg/L	0.20	0.098	10	09/21/13 09:22	09/25/13 12:41	7440-70-2	M1
Copper	**0.012**	mg/L	0.00050	0.00017	1	09/21/13 09:22	09/24/13 14:44	7440-50-8	
Iron	**0.038J**	mg/L	0.050	0.0059	1	09/21/13 09:22	09/24/13 14:44	7439-89-6	
Lead	**0.00064**	mg/L	0.00010	0.000046	1	09/21/13 09:22	09/24/13 14:44	7439-92-1	
Magnesium	**27.1**	mg/L	0.025	0.012	5	09/21/13 09:22	09/24/13 14:49	7439-95-4	M1
Silver	**0.000054J**	mg/L	0.00050	0.000050	1	09/21/13 09:22	09/25/13 12:32	7440-22-4	B,M1
Total Hardness by 2340B	**401**	mg/L	0.71	0.36	10	09/21/13 09:22	09/25/13 12:41		
Uranium-238	**0.0015**	mg/L	0.00050	0.00010	1	09/21/13 09:22	09/24/13 14:44	7440-61-1	
Zinc	**0.059**	mg/L	0.0050	0.00098	1	09/21/13 09:22	09/24/13 14:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/24/13 09:23	09/24/13 14:13	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10242261

Sample: LAO-SS-1-091613 **Lab ID: 10242261002** Collected: 09/16/13 14:15 Received: 09/17/13 08:53 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.021**	mg/L	0.0040	0.0015	1	09/21/13 09:22	09/24/13 14:54	7429-90-5	
Arsenic	**0.0072**	mg/L	0.00050	0.000093	1	09/21/13 09:22	09/24/13 14:54	7440-38-2	
Cadmium	**0.00024**	mg/L	0.000080	0.000032	1	09/21/13 09:22	09/24/13 14:54	7440-43-9	
Calcium	**103**	mg/L	0.10	0.049	5	09/21/13 09:22	09/26/13 16:07	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	09/21/13 09:22	09/24/13 14:54	7440-50-8	
Iron	**0.046J**	mg/L	0.050	0.0059	1	09/21/13 09:22	09/24/13 14:54	7439-89-6	
Lead	**0.00088**	mg/L	0.00010	0.000046	1	09/21/13 09:22	09/24/13 14:54	7439-92-1	
Magnesium	**25.4**	mg/L	0.025	0.012	5	09/21/13 09:22	09/26/13 16:07	7439-95-4	
Silver	**0.00011J**	mg/L	0.00050	0.000050	1	09/21/13 09:22	09/25/13 13:23	7440-22-4	B
Total Hardness by 2340B	**361**	mg/L	0.36	0.18	5	09/21/13 09:22	09/26/13 16:07		
Uranium-238	**0.0013**	mg/L	0.00050	0.00010	1	09/21/13 09:22	09/24/13 14:54	7440-61-1	
Zinc	**0.051**	mg/L	0.0050	0.00098	1	09/21/13 09:22	09/24/13 14:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/24/13 09:23	09/24/13 14:15	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10242261

Sample: LAO-SS-2-091613 **Lab ID: 10242261003** Collected: 09/16/13 14:23 Received: 09/17/13 08:53 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.21**	mg/L	0.0040	0.0015	1	09/21/13 09:22	09/24/13 15:08	7429-90-5	
Arsenic	**0.050**	mg/L	0.00050	0.000093	1	09/21/13 09:22	09/24/13 15:08	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000032	1	09/21/13 09:22	09/24/13 15:08	7440-43-9	
Calcium	**121**	mg/L	0.20	0.098	10	09/21/13 09:22	09/26/13 16:12	7440-70-2	
Copper	**0.66**	mg/L	0.0025	0.00087	5	09/21/13 09:22	09/24/13 15:15	7440-50-8	
Iron	**3.5**	mg/L	0.050	0.0059	1	09/21/13 09:22	09/24/13 15:08	7439-89-6	
Lead	**0.0070**	mg/L	0.00010	0.000046	1	09/21/13 09:22	09/24/13 15:08	7439-92-1	
Magnesium	**31.7**	mg/L	0.025	0.012	5	09/21/13 09:22	09/24/13 15:15	7439-95-4	
Silver	**0.000079J**	mg/L	0.00050	0.000050	1	09/21/13 09:22	09/25/13 13:42	7440-22-4	B
Total Hardness by 2340B	**432**	mg/L	0.71	0.36	10	09/21/13 09:22	09/26/13 16:12		
Uranium-238	**0.0092**	mg/L	0.00050	0.00010	1	09/21/13 09:22	09/24/13 15:08	7440-61-1	
Zinc	**5.1**	mg/L	0.10	0.020	20	09/21/13 09:22	09/27/13 11:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000059J**	mg/L	0.00020	0.000030	1	09/24/13 09:23	09/24/13 14:18	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10242261

QC Batch: MERP/9322 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10242261001, 10242261002, 10242261003

METHOD BLANK: 1532368 Matrix: Water
Associated Lab Samples: 10242261001, 10242261002, 10242261003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/24/13 14:08	

LABORATORY CONTROL SAMPLE: 1532369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0057	114	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1532370 1532371

Parameter	Units	10242261003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000059J	.005	.005	0.0056	0.0057	111	114	85-115	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10242261

QC Batch: MPRP/41948 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10242261001, 10242261002, 10242261003

METHOD BLANK: 1528015 Matrix: Water
Associated Lab Samples: 10242261001, 10242261002, 10242261003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	09/24/13 14:40	
Arsenic	mg/L	ND	0.00050	09/24/13 14:40	
Cadmium	mg/L	ND	0.000080	09/24/13 14:40	
Calcium	mg/L	ND	0.020	09/24/13 14:40	
Copper	mg/L	ND	0.00050	09/24/13 14:40	
Iron	mg/L	ND	0.050	09/24/13 14:40	
Lead	mg/L	ND	0.00010	09/24/13 14:40	
Magnesium	mg/L	ND	0.0050	09/24/13 14:40	
Silver	mg/L	0.000062J	0.00050	09/25/13 12:22	
Uranium-238	mg/L	ND	0.00050	09/24/13 14:40	
Zinc	mg/L	ND	0.0050	09/24/13 14:40	

LABORATORY CONTROL SAMPLE: 1528016

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.080	100	85-115	
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.085	106	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.083	103	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.080	100	85-115	
Magnesium	mg/L	1	1.0	105	85-115	
Silver	mg/L	.08	0.081	101	85-115	
Uranium-238	mg/L	.08	0.080	100	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528017 1528018

Parameter	Units	10242261001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.011	.08	.08	0.095	0.089	105	98	70-130	7	20	
Arsenic	mg/L	0.0067	.08	.08	0.086	0.083	99	95	70-130	3	20	
Cadmium	mg/L	0.00026	.08	.08	0.084	0.080	104	100	70-130	4	20	
Calcium	mg/L	116	1	1	113	109	-252	-664	70-130	4	20	E,M1
Copper	mg/L	0.012	.08	.08	0.092	0.090	100	97	70-130	2	20	
Iron	mg/L	0.038J	1	1	1.0	0.98	97	94	70-130	3	20	
Lead	mg/L	0.00064	.08	.08	0.077	0.075	96	92	70-130	4	20	
Magnesium	mg/L	27.1	1	1	27.8	26.8	68	-30	70-130	4	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10242261

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528017 1528018

Parameter	Units	10242261001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	0.000054J	.08	.08	0.027	0.026	34	33	70-130	3	20	M1
Uranium-238	mg/L	0.0015	.08	.08	0.080	0.077	98	95	70-130	4	20	
Zinc	mg/L	0.059	.08	.08	0.14	0.14	101	98	70-130	2	20	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10242261

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10242261

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242261001	**LAO-SS-1-091213**	EPA 200.8	MPRP/41948	EPA 200.8	ICPM/17684
10242261002	**LAO-SS-1-091613**	EPA 200.8	MPRP/41948	EPA 200.8	ICPM/17684
10242261003	**LAO-SS-2-091613**	EPA 200.8	MPRP/41948	EPA 200.8	ICPM/17684
10242261001	**LAO-SS-1-091213**	EPA 245.1	MERP/9322	EPA 245.1	MERC/10631
10242261002	**LAO-SS-1-091613**	EPA 245.1	MERP/9322	EPA 245.1	MERC/10631
10242261003	**LAO-SS-2-091613**	EPA 245.1	MERP/9322	EPA 245.1	MERC/10631

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bp rm 1124

Laboratory Management Program LaMP Chain of Custody Record

10242261

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** _____

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-091213	9/12/13	10:20		X						2				X			X						001
	LAO-SS-1-091613	9/16/13	14:15		X						2				X			X						002
	LAO-SS-2-091613	9/16/13	1423		X						1				X									003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell						
Sampler's Company: Pioneer Technical Services	CJ Kissell / PTS	9/16/13	1500	CJ / pace	9/17/13	853
Shipment Method: FED EX Ship Date: 9/16/13						
Shipment Tracking No: 5540 9197 7287						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 6.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO#: 10242261

10242261

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9197 7287

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 6.4 **Cooler Temp Corrected (°C):** 6.9 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.5 **Date and Initials of Person Examining Contents:** CJ 9-17-13

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl 2.2
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # SS-1 SS-2
Per method, VOA pH is checked after analysis				Initial when completed: CJ Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution: temp OK - metals only

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 10:42 Temp: 6.4	Corrected Temp: 6.9
Time: put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 9/18/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory on September 18, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request. Samples effected: 019, 031, 032.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

cc: Jill Bedessem, BPAR-TREC-MT

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CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10242377001	**SD0759-091313**	Water	09/16/13 09:26	09/18/13 09:00
10242377002	**SD0760-091313**	Water	09/16/13 09:33	09/18/13 09:00
10242377003	**SD0761-091313**	Water	09/16/13 09:36	09/18/13 09:00
10242377004	**SD0762-091313**	Water	09/16/13 09:41	09/18/13 09:00
10242377005	**SD0763-091313**	Water	09/16/13 09:46	09/18/13 09:00
10242377006	**SD0764-091313**	Water	09/16/13 09:50	09/18/13 09:00
10242377007	**SD0765-091313**	Water	09/16/13 09:53	09/18/13 09:00
10242377008	**SD0766-091313**	Water	09/16/13 09:59	09/18/13 09:00
10242377009	**SD0767-091313**	Water	09/16/13 10:05	09/18/13 09:00
10242377010	**SD0768-091313**	Water	09/16/13 10:09	09/18/13 09:00
10242377011	**SD0769-091313**	Water	09/16/13 10:12	09/18/13 09:00
10242377012	**SD0770-091313**	Water	09/16/13 10:16	09/18/13 09:00
10242377013	**SD0771-091313**	Water	09/16/13 10:19	09/18/13 09:00
10242377014	**SD0772-091313**	Water	09/16/13 10:23	09/18/13 09:00
10242377015	**SD0773-091313**	Water	09/16/13 10:28	09/18/13 09:00
10242377016	**SD0774-091313**	Water	09/16/13 10:34	09/18/13 09:00
10242377017	**SD0775-091313**	Water	09/16/13 10:37	09/18/13 09:00
10242377018	**SD0776-091313**	Water	09/16/13 10:41	09/18/13 09:00
10242377019	**SD0777-091313**	Water	09/16/13 10:45	09/18/13 09:00
10242377020	**SD0778-091313**	Water	09/16/13 11:04	09/18/13 09:00
10242377021	**SD0779-091313**	Water	09/16/13 11:09	09/18/13 09:00
10242377022	**SD0780-091313**	Water	09/16/13 11:13	09/18/13 09:00
10242377023	**SD0781-091313**	Water	09/16/13 11:17	09/18/13 09:00
10242377024	**SD0782-091313**	Water	09/16/13 11:22	09/18/13 09:00
10242377025	**SD0783-091313**	Water	09/16/13 11:26	09/18/13 09:00
10242377026	**SD0784-091313**	Water	09/16/13 11:38	09/18/13 09:00
10242377027	**SD0785-091313**	Water	09/16/13 11:42	09/18/13 09:00
10242377028	**SD0786-091313**	Water	09/16/13 11:45	09/18/13 09:00
10242377029	**SD0787-091313**	Water	09/16/13 11:48	09/18/13 09:00
10242377030	**SD0788-091313**	Water	09/16/13 11:52	09/18/13 09:00
10242377031	**SD0789-091313**	Water	09/16/13 11:55	09/18/13 09:00
10242377032	**SD0790-091313**	Water	09/16/13 11:58	09/18/13 09:00
10242377033	**SD0791-091313**	Water	09/16/13 12:00	09/18/13 09:00
10242377034	**SD0792-091313**	Water	09/16/13 12:06	09/18/13 09:00
10242377035	**SD0793-091313**	Water	09/16/13 12:09	09/18/13 09:00
10242377036	**SD0794-091313**	Water	09/16/13 12:13	09/18/13 09:00
10242377037	**SD0795-091313**	Water	09/16/13 12:16	09/18/13 09:00

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10242377038	**SD0796-091313**	Water	09/16/13 12:19	09/18/13 09:00
10242377039	**SD0797-091313**	Water	09/16/13 12:23	09/18/13 09:00
10242377040	**SD0798-091313**	Water	09/16/13 12:57	09/18/13 09:00
10242377041	**SD0799-091313**	Water	09/16/13 13:01	09/18/13 09:00
10242377042	**SD0800-091313**	Water	09/16/13 13:06	09/18/13 09:00
10242377043	**SD0801-091313**	Water	09/16/13 13:09	09/18/13 09:00
10242377044	**SD0802-091313**	Water	09/16/13 13:13	09/18/13 09:00
10242377045	**SD0803-091313**	Water	09/16/13 13:18	09/18/13 09:00
10242377046	**SD0804-091313**	Water	09/16/13 13:23	09/18/13 09:00
10242377047	**SD0805-091313**	Water	09/16/13 13:26	09/18/13 09:00
10242377048	**SD0806-091313**	Water	09/16/13 13:28	09/18/13 09:00
10242377049	**SD0807-091313**	Water	09/16/13 13:33	09/18/13 09:00
10242377050	**SD0808-091313**	Water	09/16/13 13:36	09/18/13 09:00
10242377051	**SD0809-091313**	Water	09/16/13 13:39	09/18/13 09:00
10242377052	**SD0810-091313**	Water	09/16/13 13:42	09/18/13 09:00
10242377053	**SD0811-091313**	Water	09/16/13 13:47	09/18/13 09:00
10242377054	**SD0812-091313**	Water	09/16/13 13:50	09/18/13 09:00
10242377055	**SD0813-091313**	Water	09/16/13 13:53	09/18/13 09:00
10242377056	**SD0814-091313**	Water	09/16/13 13:57	09/18/13 09:00
10242377057	**SD0815-091313**	Water	09/16/13 14:00	09/18/13 09:00
10242377058	**SD0816-091313**	Water	09/16/13 14:04	09/18/13 09:00
10242377059	**SD0817-091313**	Water	09/16/13 14:07	09/18/13 09:00
10242377060	**SD0818-091313**	Water	09/16/13 14:10	09/18/13 09:00
10242377061	**SD0819-091313**	Water	09/16/13 14:19	09/18/13 09:00
10242377062	**SD0820-091313**	Water	09/16/13 14:22	09/18/13 09:00
10242377063	**SD0821-091313**	Water	09/16/13 14:26	09/18/13 09:00
10242377064	**SD0822-091313**	Water	09/16/13 14:30	09/18/13 09:00
10242377065	**SD0823-091313**	Water	09/16/13 14:34	09/18/13 09:00
10242377066	**SD0824-091313**	Water	09/16/13 14:37	09/18/13 09:00
10242377067	**SD0825-091313**	Water	09/16/13 14:42	09/18/13 09:00
10242377068	**SD0826-091313**	Water	09/16/13 14:46	09/18/13 09:00
10242377069	**SD0827-091313**	Water	09/16/13 14:49	09/18/13 09:00
10242377070	**SD0828-091313**	Water	09/16/13 14:51	09/18/13 09:00
10242377071	**SD0829-091313**	Water	09/16/13 14:55	09/18/13 09:00
10242377072	**SD0830-091313**	Water	09/16/13 14:58	09/18/13 09:00
10242377073	**SD0831-091313**	Water	09/16/13 15:02	09/18/13 09:00

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10242377001	**SD0759-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377002	**SD0760-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377003	**SD0761-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377004	**SD0762-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377005	**SD0763-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377006	**SD0764-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377007	**SD0765-091313**	EPA 200.8	TT3	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377008	**SD0766-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377009	**SD0767-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377010	**SD0768-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377011	**SD0769-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377012	**SD0770-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377013	**SD0771-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377014	**SD0772-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377015	**SD0773-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377016	**SD0774-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377017	**SD0775-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377018	**SD0776-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377019	**SD0777-091313**	EPA 200.8	TT3	12
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	HNKH	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10242377020	**SD0778-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377021	**SD0779-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377022	**SD0780-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377023	**SD0781-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377024	**SD0782-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
10242377025	**SD0783-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377026	**SD0784-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377027	**SD0785-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377028	**SD0786-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377029	**SD0787-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377030	**SD0788-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10242377031	**SD0789-091313**	EPA 200.8	TT3	12
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10242377032	**SD0790-091313**	EPA 200.8	TT3	12
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	JFP	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10242377033	**SD0791-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377034	**SD0792-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377035	**SD0793-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377036	**SD0794-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377037	**SD0795-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377038	**SD0796-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377039	**SD0797-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377040	**SD0798-091313**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377041	**SD0799-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377042	**SD0800-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10242377043	**SD0801-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377044	**SD0802-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377045	**SD0803-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377046	**SD0804-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377047	**SD0805-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377048	**SD0806-091313**	EPA 200.8	RB1	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377049	**SD0807-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377050	**SD0808-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377051	**SD0809-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377052	**SD0810-091313**	EPA 200.8	RB1	5
		EPA 245.1	WBS	1
10242377053	**SD0811-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377054	**SD0812-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10242377055	**SD0813-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377056	**SD0814-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377057	**SD0815-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377058	**SD0816-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377059	**SD0817-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377060	**SD0818-091313**	EPA 200.8	RB1	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377061	**SD0819-091313**	EPA 200.8	RB1	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377062	**SD0820-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377063	**SD0821-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377064	**SD0822-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377065	**SD0823-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377066	**SD0824-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377067	**SD0825-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377068	**SD0826-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	JFP	1
		ASTM D516	KEO	1
10242377069	**SD0827-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377070	**SD0828-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377071	**SD0829-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377072	**SD0830-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10242377073	**SD0831-091313**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
73 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41977

B: Analyte was detected in the associated method blank.

- BLANK for HBN 268952 [MPRP/419 (Lab ID: 1529129)
  - Zinc

QC Batch: MPRP/41988

B: Analyte was detected in the associated method blank.

- BLANK for HBN 268998 [MPRP/419 (Lab ID: 1529498)
  - Arsenic
  - Zinc

QC Batch: MPRP/41989

B: Analyte was detected in the associated method blank.

- BLANK for HBN 269000 [MPRP/419 (Lab ID: 1529507)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

QC Batch: MPRP/41988

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377041,10242377051

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1529500)
  - Lead
- MS (Lab ID: 1529502)
  - Copper
  - Lead
  - Zinc
- MSD (Lab ID: 1529501)
  - Lead

QC Batch: MPRP/41989

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377061,10242377071

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1529511)
  - Copper
  - Lead
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41977

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1529131)
  - Manganese
- MSD (Lab ID: 1529132)
  - Manganese

QC Batch: MPRP/41988

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1529500)
  - Copper
  - Lead
  - Zinc
- MS (Lab ID: 1529502)
  - Copper
  - Lead
  - Zinc
- MSD (Lab ID: 1529501)
  - Copper
  - Lead
  - Zinc

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

Analyte Comments:

QC Batch: MPRP/41989

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1529511)
  - Copper
  - Lead
  - Zinc

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
72 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41986

B: Analyte was detected in the associated method blank.

- BLANK for HBN 268996 [MPRP/419 (Lab ID: 1529488)
  - Zinc, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
73 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/9347

B: Analyte was detected in the associated method blank.

- BLANK for HBN 269750 [MERP/934 (Lab ID: 1534074)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9280

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377022,10242377040

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1528115)
  - Mercury

R1: RPD value was outside control limits.

- MSD (Lab ID: 1528116)
  - Mercury

QC Batch: MERP/9282

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377062,10242377073

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1528129)
  - Mercury

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
72 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0777-091313 (Lab ID: 10242377019)
- SD0789-091313 (Lab ID: 10242377031)
- SD0790-091313 (Lab ID: 10242377032)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
71 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0785-091313 (Lab ID: 10242377027)
- SD0786-091313 (Lab ID: 10242377028)
- SD0787-091313 (Lab ID: 10242377029)
- SD0788-091313 (Lab ID: 10242377030)
- SD0789-091313 (Lab ID: 10242377031)
- SD0790-091313 (Lab ID: 10242377032)
- SD0791-091313 (Lab ID: 10242377033)
- SD0792-091313 (Lab ID: 10242377034)
- SD0793-091313 (Lab ID: 10242377035)
- SD0794-091313 (Lab ID: 10242377036)
- SD0817-091313 (Lab ID: 10242377059)
- SD0818-091313 (Lab ID: 10242377060)
- SD0819-091313 (Lab ID: 10242377061)
- SD0820-091313 (Lab ID: 10242377062)
- SD0821-091313 (Lab ID: 10242377063)
- SD0822-091313 (Lab ID: 10242377064)
- SD0823-091313 (Lab ID: 10242377065)
- SD0824-091313 (Lab ID: 10242377066)
- SD0825-091313 (Lab ID: 10242377067)
- SD0826-091313 (Lab ID: 10242377068)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0777-091313 (Lab ID: 10242377019)
- SD0789-091313 (Lab ID: 10242377031)
- SD0790-091313 (Lab ID: 10242377032)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0777-091313 (Lab ID: 10242377019)
- SD0789-091313 (Lab ID: 10242377031)
- SD0790-091313 (Lab ID: 10242377032)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
71 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16165

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377041,10242377053

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1536448)
  - Sulfate
- MSD (Lab ID: 1536450)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0777-091313 (Lab ID: 10242377019)
- SD0789-091313 (Lab ID: 10242377031)
- SD0790-091313 (Lab ID: 10242377032)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
3 samples were analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0777-091313 (Lab ID: 10242377019)
- SD0789-091313 (Lab ID: 10242377031)
- SD0790-091313 (Lab ID: 10242377032)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0759-091313 **Lab ID: 10242377001** Collected: 09/16/13 09:26 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 17:34	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 17:34	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 17:34	7440-50-8	
Lead	**0.084**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 17:34	7439-92-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	09/20/13 17:10	09/25/13 17:34	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0080**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/25/13 23:47	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/25/13 23:47	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/25/13 23:47	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/25/13 23:47	7439-92-1	
Zinc, Dissolved	**0.039**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/25/13 23:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00018J**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 09:48	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:11	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**95.3**	mg/L	10.0	5.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.5**	mg/L	2.5	1.2	1		09/27/13 09:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0760-091313 **Lab ID: 10242377002** Collected: 09/16/13 09:33 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 17:46	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 17:46	7440-43-9	
Copper	**0.28**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 17:46	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 17:46	7439-92-1	
Zinc	**0.49**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 17:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 00:10	7440-38-2	
Cadmium, Dissolved	**0.00055**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 00:10	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 00:10	7440-50-8	
Lead, Dissolved	**0.041**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 00:10	7439-92-1	
Zinc, Dissolved	**0.14**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 00:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00037**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 09:50	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:14	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**174**	mg/L	10.0	5.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.6**	mg/L	2.5	1.2	1		09/27/13 09:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0761-091313 **Lab ID: 10242377003** Collected: 09/16/13 09:36 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 17:58	7440-38-2	
Cadmium	**0.0025**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 17:58	7440-43-9	
Copper	**0.46**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 18:04	7440-50-8	
Lead	**0.26**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 17:58	7439-92-1	
Zinc	**0.83**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 18:04	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 00:22	7440-38-2	
Cadmium, Dissolved	**0.00023**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 00:22	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 00:22	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 00:22	7439-92-1	
Zinc, Dissolved	**0.042**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 00:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00058**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:02	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:16	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**365**	mg/L	20.0	10.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.5**	mg/L	2.5	1.2	1		09/27/13 09:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0762-091313 **Lab ID: 10242377004** Collected: 09/16/13 09:41 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.063**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 18:40	7440-38-2	
Cadmium	**0.0040**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 18:40	7440-43-9	
Copper	**0.66**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 18:46	7440-50-8	
Lead	**0.67**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 18:46	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 18:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 00:49	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 00:49	7440-43-9	
Copper, Dissolved	**0.028**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 00:49	7440-50-8	
Lead, Dissolved	**0.0037**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 00:49	7439-92-1	
Zinc, Dissolved	**0.015**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 00:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0018**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:05	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:29	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**644**	mg/L	20.0	10.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.3**	mg/L	2.5	1.2	1		09/27/13 09:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0763-091313 **Lab ID: 10242377005** Collected: 09/16/13 09:46 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.075**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 18:52	7440-38-2	
Cadmium	**0.0065**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 18:52	7440-43-9	
Copper	**0.98**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 18:58	7440-50-8	
Lead	**0.85**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 18:58	7439-92-1	
Zinc	**2.2**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 18:58	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0074**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 01:00	7440-38-2	
Cadmium, Dissolved	**0.00011**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 01:00	7440-43-9	
Copper, Dissolved	**0.020**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 01:00	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 01:00	7439-92-1	
Zinc, Dissolved	**0.0065**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 01:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0018**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:07	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:31	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1320**	mg/L	20.0	10.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.4**	mg/L	2.5	1.2	1		09/27/13 09:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0764-091313 **Lab ID: 10242377006** Collected: 09/16/13 09:50 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 19:04	7440-38-2	
Cadmium	**0.0027**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 19:04	7440-43-9	
Copper	**0.63**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 19:10	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 19:04	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 19:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0040**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 01:10	7440-38-2	
Cadmium, Dissolved	**0.00050**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 01:10	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 01:10	7440-50-8	
Lead, Dissolved	**0.0037**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 01:10	7439-92-1	
Zinc, Dissolved	**0.12**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 01:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00027**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:10	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**959**	mg/L	20.0	10.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.8**	mg/L	2.5	1.2	1		09/27/13 09:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0765-091313 **Lab ID: 10242377007** Collected: 09/16/13 09:53 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 19:16	7440-38-2	
Cadmium	**0.0027**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 19:16	7440-43-9	
Copper	**0.65**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 19:22	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 19:16	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 19:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0038**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 01:20	7440-38-2	
Cadmium, Dissolved	**0.00053**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 01:20	7440-43-9	
Copper, Dissolved	**0.039**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 01:20	7440-50-8	
Lead, Dissolved	**0.0037**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 01:20	7439-92-1	
Zinc, Dissolved	**0.11**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 01:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00032**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:12	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:36	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**819**	mg/L	20.0	10.0	1		09/20/13 11:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10**	mg/L	2.5	1.2	1		09/27/13 09:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0766-091313 **Lab ID: 10242377008** Collected: 09/16/13 09:59 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 19:28	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 19:28	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 19:28	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 19:28	7439-92-1	
Zinc	**0.0010J**	mg/L	0.0050	0.00098	1	09/20/13 17:10	09/25/13 19:28	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 01:30	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 01:30	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 01:30	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 01:30	7439-92-1	
Zinc, Dissolved	**0.0011J**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 01:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**22.5**	mg/L	10.0	5.0	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/27/13 09:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0767-091313 **Lab ID: 10242377009** Collected: 09/16/13 10:05 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 19:56	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 19:56	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 19:56	7440-50-8	
Lead	**0.079**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 19:56	7439-92-1	
Zinc	**0.33**	mg/L	0.0050	0.00098	1	09/20/13 17:10	09/25/13 19:56	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0086**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 01:58	7440-38-2	
Cadmium, Dissolved	**0.00034**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 01:58	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 01:58	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 01:58	7439-92-1	
Zinc, Dissolved	**0.081**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 01:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00030**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:17	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:41	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**102**	mg/L	10.0	5.0	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		09/27/13 09:58	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0768-091313 **Lab ID: 10242377010** Collected: 09/16/13 10:09 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 20:07	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 20:07	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 20:07	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 20:07	7439-92-1	
Zinc	**0.42**	mg/L	0.0050	0.00098	1	09/20/13 17:10	09/25/13 20:07	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0086**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 02:08	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 02:08	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 02:08	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 02:08	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 02:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00011J**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:25	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**115**	mg/L	10.0	5.0	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.8**	mg/L	2.5	1.2	1		09/27/13 09:58	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0769-091313 **Lab ID: 10242377011** Collected: 09/16/13 10:12 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.028**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 20:18	7440-38-2	
Cadmium	**0.0020**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 20:18	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 20:18	7440-50-8	
Lead	**0.23**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 20:18	7439-92-1	
Zinc	**0.68**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 20:24	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0088**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 02:18	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 02:18	7440-43-9	
Copper, Dissolved	**0.062**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 02:18	7440-50-8	
Lead, Dissolved	**0.0040**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 02:18	7439-92-1	
Zinc, Dissolved	**0.058**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 02:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00030**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:27	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**149**	mg/L	10.0	5.0	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.6**	mg/L	2.5	1.2	1		09/27/13 09:58	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0770-091313 **Lab ID: 10242377012** Collected: 09/16/13 10:16 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.047**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 20:36	7440-38-2	
Cadmium	**0.0048**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 20:36	7440-43-9	
Copper	**0.43**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 20:36	7440-50-8	
Lead	**0.64**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 20:42	7439-92-1	
Zinc	**1.7**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 20:42	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0073**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 02:34	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 02:34	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 02:34	7440-50-8	
Lead, Dissolved	**0.0030**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 02:34	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 02:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00065**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:30	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**482**	mg/L	14.3	7.1	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.2**	mg/L	2.5	1.2	1		09/27/13 10:01	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0771-091313 **Lab ID: 10242377013** Collected: 09/16/13 10:19 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.086**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 21:06	7440-38-2	
Cadmium	**0.0087**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 21:06	7440-43-9	
Copper	**0.89**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 21:12	7440-50-8	
Lead	**1.1**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 21:12	7439-92-1	
Zinc	**3.0**	mg/L	0.050	0.0098	10	09/20/13 17:10	09/26/13 12:45	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0090**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 03:03	7440-38-2	
Cadmium, Dissolved	**0.00010**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 03:03	7440-43-9	
Copper, Dissolved	**0.031**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 03:03	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 03:03	7439-92-1	
Zinc, Dissolved	**0.013**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 03:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**785**	mg/L	14.3	7.1	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.8**	mg/L	2.5	1.2	1		09/27/13 10:01	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0772-091313 **Lab ID: 10242377014** Collected: 09/16/13 10:23 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.066**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 21:18	7440-38-2	
Cadmium	**0.0071**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 21:18	7440-43-9	
Copper	**0.82**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 21:24	7440-50-8	
Lead	**0.80**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 21:24	7439-92-1	
Zinc	**2.6**	mg/L	0.050	0.0098	10	09/20/13 17:10	09/26/13 12:51	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0064**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 03:13	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 03:13	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 03:13	7440-50-8	
Lead, Dissolved	**0.0024**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 03:13	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 03:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00047**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:34	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 11:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**748**	mg/L	14.3	7.1	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.8**	mg/L	2.5	1.2	1		09/27/13 10:01	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0773-091313 **Lab ID: 10242377015** Collected: 09/16/13 10:28 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.047**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 21:30	7440-38-2	
Cadmium	**0.0031**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 21:30	7440-43-9	
Copper	**0.72**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 21:36	7440-50-8	
Lead	**0.40**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 21:30	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 21:36	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0076**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 03:24	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 03:24	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 03:24	7440-50-8	
Lead, Dissolved	**0.0030**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 03:24	7439-92-1	
Zinc, Dissolved	**0.020**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 03:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00024**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:37	7439-97-6	B
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 12:01	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**673**	mg/L	20.0	10.0	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.9**	mg/L	2.5	1.2	1		09/27/13 10:01	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0774-091313 **Lab ID: 10242377016** Collected: 09/16/13 10:34 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.039**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 21:42	7440-38-2	
Cadmium	**0.0028**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 21:42	7440-43-9	
Copper	**0.47**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 21:48	7440-50-8	
Lead	**0.37**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 21:42	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 21:48	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 03:34	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 03:34	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 03:34	7440-50-8	
Lead, Dissolved	**0.0030**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 03:34	7439-92-1	
Zinc, Dissolved	**0.028**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 03:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00048**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:39	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 12:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**404**	mg/L	14.3	7.1	1		09/20/13 11:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.1**	mg/L	2.5	1.2	1		09/27/13 10:01	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0775-091313 **Lab ID: 10242377017** Collected: 09/16/13 10:37 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.10**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 21:54	7440-38-2	
Cadmium	**0.010**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 21:54	7440-43-9	
Copper	**1.1**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 22:00	7440-50-8	
Lead	**1.3**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 22:00	7439-92-1	
Zinc	**4.1**	mg/L	0.050	0.0098	10	09/20/13 17:10	09/26/13 12:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0090**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 03:44	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 03:44	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 03:44	7440-50-8	
Lead, Dissolved	**0.0036**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 03:44	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 03:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 12:10	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1270**	mg/L	20.0	10.0	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.4**	mg/L	2.5	1.2	1		09/27/13 10:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0776-091313 **Lab ID: 10242377018** Collected: 09/16/13 10:41 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.073**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 22:24	7440-38-2	
Cadmium	**0.0074**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 22:24	7440-43-9	
Copper	**0.71**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 22:30	7440-50-8	
Lead	**1.2**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 22:30	7439-92-1	
Zinc	**2.7**	mg/L	0.050	0.0098	10	09/20/13 17:10	09/26/13 13:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0074**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 04:12	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 04:12	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 04:12	7440-50-8	
Lead, Dissolved	**0.0037**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 04:12	7439-92-1	
Zinc, Dissolved	**0.021**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 04:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00077**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:49	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 12:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1190**	mg/L	20.0	10.0	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.0**	mg/L	2.5	1.2	1		09/27/13 10:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0777-091313 **Lab ID: 10242377019** Collected: 09/16/13 10:45 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.063**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 22:36	7440-38-2	
Cadmium	**0.0071**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 22:36	7440-43-9	
Calcium	**68.7**	mg/L	0.20	0.098	10	09/20/13 17:10	09/26/13 13:09	7440-70-2	
Copper	**0.70**	mg/L	0.0025	0.00087	5	09/20/13 17:10	09/25/13 22:42	7440-50-8	
Iron	**28.9**	mg/L	0.50	0.059	10	09/20/13 17:10	09/26/13 13:09	7439-89-6	
Lead	**0.85**	mg/L	0.00050	0.00023	5	09/20/13 17:10	09/25/13 22:42	7439-92-1	
Magnesium	**14.0**	mg/L	0.050	0.024	10	09/20/13 17:10	09/26/13 13:09	7439-95-4	
Manganese	**3.8**	mg/L	0.0050	0.0018	10	09/20/13 17:10	09/26/13 13:09	7439-96-5	
Potassium	**10.0**	mg/L	0.20	0.047	10	09/20/13 17:10	09/26/13 13:09	7440-09-7	
Silica	**118**	mg/L	0.54	0.27	10	09/20/13 17:10	09/26/13 13:09	7631-86-9	
Sodium	**4.1**	mg/L	0.50	0.10	10	09/20/13 17:10	09/26/13 13:09	7440-23-5	
Zinc	**2.6**	mg/L	0.050	0.0098	10	09/20/13 17:10	09/26/13 13:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0049**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 04:23	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 04:23	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 04:23	7440-50-8	
Lead, Dissolved	**0.0023**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 04:23	7439-92-1	
Zinc, Dissolved	**0.048**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 04:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00079**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:52	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 12:15	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**88.1**	mg/L	5.0	2.5	1		01/03/14 13:12		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1430**	mg/L	20.0	10.0	1		09/20/13 12:33		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.1**	Std. Units	0.10	0.050	1		01/03/14 15:01		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**0.36**	mg/L	0.10	0.050	1		01/03/14 12:23	14797-55-8	H1
Nitrogen, NO2 plus NO3	**0.36**	mg/L	0.10	0.050	1		01/03/14 12:23		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.2**	mg/L	2.5	1.2	1		09/27/13 10:03	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**4.2**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0777-091313 **Lab ID: 10242377019** Collected: 09/16/13 10:45 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0778-091313 **Lab ID: 10242377020** Collected: 09/16/13 11:04 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.034**	mg/L	0.00050	0.000093	1	09/20/13 17:10	09/25/13 22:48	7440-38-2	
Cadmium	**0.0023**	mg/L	0.000080	0.000032	1	09/20/13 17:10	09/25/13 22:48	7440-43-9	
Copper	**0.21**	mg/L	0.00050	0.00017	1	09/20/13 17:10	09/25/13 22:48	7440-50-8	
Lead	**0.26**	mg/L	0.00010	0.000046	1	09/20/13 17:10	09/25/13 22:48	7439-92-1	
Zinc	**0.69**	mg/L	0.025	0.0049	5	09/20/13 17:10	09/25/13 22:54	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0081**	mg/L	0.00050	0.000093	1	09/20/13 17:08	09/26/13 04:33	7440-38-2	
Cadmium, Dissolved	**0.00022**	mg/L	0.000080	0.000032	1	09/20/13 17:08	09/26/13 04:33	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	09/20/13 17:08	09/26/13 04:33	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/20/13 17:08	09/26/13 04:33	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	09/20/13 17:08	09/26/13 04:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00070**	mg/L	0.00020	0.000030	1	09/25/13 13:24	09/26/13 10:54	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 13:21	09/26/13 12:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**337**	mg/L	10.0	5.0	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.3**	mg/L	2.5	1.2	1		09/27/13 10:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0779-091313 **Lab ID: 10242377021** Collected: 09/16/13 11:09 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.033**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 18:31	7440-38-2	
Cadmium	**0.0023**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 18:31	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 18:31	7440-50-8	
Lead	**0.31**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 18:31	7439-92-1	
Zinc	**0.69**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 18:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 02:25	7440-38-2	
Cadmium, Dissolved	**0.00069**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 02:25	7440-43-9	
Copper, Dissolved	**0.068**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 02:25	7440-50-8	
Lead, Dissolved	**0.075**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 02:25	7439-92-1	
Zinc, Dissolved	**0.17**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 02:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00070**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00015J**	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 12:54	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**412**	mg/L	14.3	7.1	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.8**	mg/L	2.5	1.2	1		09/27/13 10:19	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0780-091313 **Lab ID: 10242377022** Collected: 09/16/13 11:13 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 19:13	7440-38-2	
Cadmium	**0.0031**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 19:13	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 19:13	7440-50-8	
Lead	**0.36**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 19:13	7439-92-1	
Zinc	**0.87**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 19:19	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0078**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 02:49	7440-38-2	
Cadmium, Dissolved	**0.00023**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 02:49	7440-43-9	
Copper, Dissolved	**0.029**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 02:49	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 02:49	7439-92-1	
Zinc, Dissolved	**0.029**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 02:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00091**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:23	7439-97-6	M1,R1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 12:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**340**	mg/L	10.0	5.0	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.4**	mg/L	2.5	1.2	1		09/27/13 10:22	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0781-091313 **Lab ID: 10242377023** Collected: 09/16/13 11:17 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 19:25	7440-38-2	
Cadmium	**0.0041**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 19:25	7440-43-9	
Copper	**0.24**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 19:25	7440-50-8	
Lead	**0.38**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 19:25	7439-92-1	
Zinc	**0.98**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 19:31	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 03:01	7440-38-2	
Cadmium, Dissolved	**0.00030**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 03:01	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 03:01	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 03:01	7439-92-1	
Zinc, Dissolved	**0.047**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 03:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:43	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:09	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**450**	mg/L	14.3	7.1	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.0**	mg/L	2.5	1.2	1		09/27/13 10:22	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0782-091313 **Lab ID: 10242377024** Collected: 09/16/13 11:22 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.037**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 19:37	7440-38-2	
Cadmium	**0.0060**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 19:37	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 19:37	7440-50-8	
Lead	**0.36**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 19:37	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 19:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0074**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 03:31	7440-38-2	
Cadmium, Dissolved	**0.00032**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 03:31	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 03:31	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 03:31	7439-92-1	
Zinc, Dissolved	**0.046**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 03:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:46	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:11	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**439**	mg/L	14.3	7.1	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.2**	mg/L	2.5	1.2	1		09/27/13 10:22	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0783-091313 **Lab ID: 10242377025** Collected: 09/16/13 11:26 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.033**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 19:49	7440-38-2	
Cadmium	**0.0093**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 19:49	7440-43-9	
Copper	**0.24**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 19:49	7440-50-8	
Lead	**0.28**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 19:49	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 19:55	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0080**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 03:43	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 03:43	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 03:43	7440-50-8	
Lead, Dissolved	**0.00075**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 03:43	7439-92-1	
Zinc, Dissolved	**0.050**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 03:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0011**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.0027**	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:14	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**290**	mg/L	10.0	5.0	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**27.3**	mg/L	5.0	2.5	2		09/27/13 10:53	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0784-091313 **Lab ID: 10242377026** Collected: 09/16/13 11:38 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 20:01	7440-38-2	
Cadmium	**0.00072**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 20:01	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 20:01	7440-50-8	
Lead	**0.041**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 20:01	7439-92-1	
Zinc	**0.15**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 20:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 03:54	7440-38-2	
Cadmium, Dissolved	**0.00039**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 03:54	7440-43-9	
Copper, Dissolved	**0.074**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 03:54	7440-50-8	
Lead, Dissolved	**0.0055**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 03:54	7439-92-1	
Zinc, Dissolved	**0.042**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 03:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000066J**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:16	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**58.0**	mg/L	10.0	5.0	1		09/20/13 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.0**	mg/L	2.5	1.2	1		09/27/13 10:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0785-091313 **Lab ID: 10242377027** Collected: 09/16/13 11:42 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 20:31	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 20:31	7440-43-9	
Copper	**0.24**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 20:31	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 20:31	7439-92-1	
Zinc	**0.40**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 20:31	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 04:04	7440-38-2	
Cadmium, Dissolved	**0.00045**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 04:04	7440-43-9	
Copper, Dissolved	**0.055**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 04:04	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 04:04	7439-92-1	
Zinc, Dissolved	**0.030**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 04:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00027**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:19	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**125**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.8**	mg/L	2.5	1.2	1		09/27/13 10:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0786-091313 **Lab ID: 10242377028** Collected: 09/16/13 11:45 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.036**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 20:43	7440-38-2	
Cadmium	**0.0023**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 20:43	7440-43-9	
Copper	**0.34**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 20:43	7440-50-8	
Lead	**0.20**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 20:43	7439-92-1	
Zinc	**0.65**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 20:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 04:14	7440-38-2	
Cadmium, Dissolved	**0.00044**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 04:14	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 04:14	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 04:14	7439-92-1	
Zinc, Dissolved	**0.027**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 04:14	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00037**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:21	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**188**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.8**	mg/L	2.5	1.2	1		09/27/13 10:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0787-091313 **Lab ID: 10242377029** Collected: 09/16/13 11:48 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.039**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 20:55	7440-38-2	
Cadmium	**0.0028**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 20:55	7440-43-9	
Copper	**0.40**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 20:55	7440-50-8	
Lead	**0.27**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 20:55	7439-92-1	
Zinc	**0.80**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 21:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0092**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 04:43	7440-38-2	
Cadmium, Dissolved	**0.00033**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 04:43	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 04:43	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 04:43	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 04:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00057**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 11:58	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:24	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**290**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.7**	mg/L	2.5	1.2	1		09/27/13 10:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0788-091313 **Lab ID: 10242377030** Collected: 09/16/13 11:52 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.038**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 21:07	7440-38-2	
Cadmium	**0.0027**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 21:07	7440-43-9	
Copper	**0.41**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 21:07	7440-50-8	
Lead	**0.33**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 21:07	7439-92-1	
Zinc	**0.97**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 21:13	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0070**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 04:54	7440-38-2	
Cadmium, Dissolved	**0.00022**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 04:54	7440-43-9	
Copper, Dissolved	**0.033**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 04:54	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 04:54	7439-92-1	
Zinc, Dissolved	**0.018**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 04:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0010**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:05	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:31	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**384**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.6**	mg/L	2.5	1.2	1		09/27/13 10:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0789-091313 **Lab ID: 10242377031** Collected: 09/16/13 11:55 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.045**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 21:19	7440-38-2	
Cadmium	**0.0043**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 21:19	7440-43-9	
Calcium	**33.3**	mg/L	0.10	0.049	5	09/20/13 18:21	09/27/13 21:25	7440-70-2	
Copper	**0.56**	mg/L	0.0025	0.00087	5	09/20/13 18:21	09/27/13 21:25	7440-50-8	
Iron	**18.7**	mg/L	0.050	0.0059	1	09/20/13 18:21	09/27/13 21:19	7439-89-6	
Lead	**0.45**	mg/L	0.00050	0.00023	5	09/20/13 18:21	09/27/13 21:25	7439-92-1	
Magnesium	**9.8**	mg/L	0.0050	0.0024	1	09/20/13 18:21	09/27/13 21:19	7439-95-4	
Manganese	**1.2**	mg/L	0.0025	0.00092	5	09/20/13 18:21	09/27/13 21:25	7439-96-5	
Potassium	**9.4**	mg/L	0.020	0.0047	1	09/20/13 18:21	09/27/13 21:19	7440-09-7	
Silica	**87.7**	mg/L	0.27	0.13	5	09/20/13 18:21	09/27/13 21:25	7631-86-9	
Sodium	**3.6**	mg/L	0.050	0.010	1	09/20/13 18:21	09/27/13 21:19	7440-23-5	
Zinc	**1.5**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 21:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0070**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 05:04	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 05:04	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 05:04	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 05:04	7439-92-1	
Zinc, Dissolved	**0.021**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 05:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00071**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:08	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:33	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**58.2**	mg/L	5.0	2.5	1		01/03/14 13:16		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**785**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.1**	Std. Units	0.10	0.050	1		01/03/14 15:03		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.4**	mg/L	0.10	0.050	1		01/03/14 12:24	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.4**	mg/L	0.10	0.050	1		01/03/14 12:24		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.0**	mg/L	2.5	1.2	1		09/27/13 10:49	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**5.9**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0789-091313 **Lab ID: 10242377031** Collected: 09/16/13 11:55 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0790-091313 **Lab ID: 10242377032** Collected: 09/16/13 11:58 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.048**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 21:49	7440-38-2	
Cadmium	**0.0043**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 21:49	7440-43-9	
Calcium	**34.0**	mg/L	0.10	0.049	5	09/20/13 18:21	09/27/13 21:55	7440-70-2	
Copper	**0.58**	mg/L	0.0025	0.00087	5	09/20/13 18:21	09/27/13 21:55	7440-50-8	
Iron	**19.5**	mg/L	0.050	0.0059	1	09/20/13 18:21	09/27/13 21:49	7439-89-6	
Lead	**0.50**	mg/L	0.00050	0.00023	5	09/20/13 18:21	09/27/13 21:55	7439-92-1	
Magnesium	**10.2**	mg/L	0.0050	0.0024	1	09/20/13 18:21	09/27/13 21:49	7439-95-4	
Manganese	**1.2**	mg/L	0.0025	0.00092	5	09/20/13 18:21	09/27/13 21:55	7439-96-5	
Potassium	**9.7**	mg/L	0.020	0.0047	1	09/20/13 18:21	09/27/13 21:49	7440-09-7	
Silica	**92.1**	mg/L	0.27	0.13	5	09/20/13 18:21	09/27/13 21:55	7631-86-9	
Sodium	**3.7**	mg/L	0.050	0.010	1	09/20/13 18:21	09/27/13 21:49	7440-23-5	
Zinc	**1.6**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 21:55	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0069**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 05:15	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 05:15	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 05:15	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 05:15	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 05:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00067**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:10	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:36	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**57.8**	mg/L	5.0	2.5	1		01/03/14 13:30		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**909**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.2**	Std. Units	0.10	0.050	1		01/03/14 15:04		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.2**	mg/L	0.10	0.050	1		01/03/14 12:28	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		01/03/14 12:28		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.0**	mg/L	2.5	1.2	1		09/27/13 10:30	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**6.3**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0790-091313 **Lab ID: 10242377032** Collected: 09/16/13 11:58 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0791-091313 **Lab ID: 10242377033** Collected: 09/16/13 12:00 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 22:01	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 22:01	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 22:01	7440-50-8	
Lead	**0.000053J**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 22:01	7439-92-1	
Zinc	**0.0011J**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 22:01	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 05:25	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 05:25	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 05:25	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 05:25	7439-92-1	
Zinc, Dissolved	**0.0013J**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 05:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:13	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**12.2**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/27/13 10:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0792-091313 **Lab ID: 10242377034** Collected: 09/16/13 12:06 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0094**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 22:13	7440-38-2	
Cadmium	**0.00029**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 22:13	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 22:13	7440-50-8	
Lead	**0.018**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 22:13	7439-92-1	
Zinc	**0.10**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 22:13	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0057**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 05:53	7440-38-2	
Cadmium, Dissolved	**0.000075J**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 05:53	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 05:53	7440-50-8	
Lead, Dissolved	**0.00064**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 05:53	7439-92-1	
Zinc, Dissolved	**0.020**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 05:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:41	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**66.3**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.2**	mg/L	2.5	1.2	1		09/27/13 10:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0793-091313 **Lab ID: 10242377035** Collected: 09/16/13 12:09 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 22:25	7440-38-2	
Cadmium	**0.00056**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 22:25	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 22:25	7440-50-8	
Lead	**0.038**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 22:25	7439-92-1	
Zinc	**0.17**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 22:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0069**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 06:05	7440-38-2	
Cadmium, Dissolved	**0.000097**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 06:05	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 06:05	7440-50-8	
Lead, Dissolved	**0.00072**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 06:05	7439-92-1	
Zinc, Dissolved	**0.016**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 06:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:43	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**139**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.0**	mg/L	2.5	1.2	1		09/27/13 10:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0794-091313 **Lab ID: 10242377036** Collected: 09/16/13 12:13 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 22:37	7440-38-2	
Cadmium	**0.00064**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 22:37	7440-43-9	
Copper	**0.27**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 22:37	7440-50-8	
Lead	**0.046**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 22:37	7439-92-1	
Zinc	**0.22**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 22:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0060**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 06:15	7440-38-2	
Cadmium, Dissolved	**0.00010**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 06:15	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 06:15	7440-50-8	
Lead, Dissolved	**0.00056**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 06:15	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 06:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:46	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**226**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.0**	mg/L	2.5	1.2	1		09/27/13 10:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0795-091313 **Lab ID: 10242377037** Collected: 09/16/13 12:16 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 23:07	7440-38-2	
Cadmium	**0.00079**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 23:07	7440-43-9	
Copper	**0.34**	mg/L	0.00050	0.00017	1	09/20/13 18:21	09/27/13 23:07	7440-50-8	
Lead	**0.053**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 23:07	7439-92-1	
Zinc	**0.31**	mg/L	0.0050	0.00098	1	09/20/13 18:21	09/27/13 23:07	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0061**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 06:26	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 06:26	7440-43-9	
Copper, Dissolved	**0.069**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 06:26	7440-50-8	
Lead, Dissolved	**0.00054**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 06:26	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 06:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000032J**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**97.5**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.1**	mg/L	2.5	1.2	1		09/27/13 10:32	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0796-091313 **Lab ID: 10242377038** Collected: 09/16/13 12:19 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.035**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 23:19	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 23:19	7440-43-9	
Copper	**0.63**	mg/L	0.0025	0.00087	5	09/20/13 18:21	09/27/13 23:25	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 23:19	7439-92-1	
Zinc	**0.50**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 23:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0068**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 06:36	7440-38-2	
Cadmium, Dissolved	**0.00011**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 06:36	7440-43-9	
Copper, Dissolved	**0.073**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 06:36	7440-50-8	
Lead, Dissolved	**0.00064**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 06:36	7439-92-1	
Zinc, Dissolved	**0.016**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 06:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:30	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**318**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.9**	mg/L	2.5	1.2	1		09/27/13 10:32	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0797-091313 **Lab ID: 10242377039** Collected: 09/16/13 12:23 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.18**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 23:31	7440-38-2	
Cadmium	**0.0033**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 23:31	7440-43-9	
Copper	**2.1**	mg/L	0.0025	0.00087	5	09/20/13 18:21	09/27/13 23:37	7440-50-8	
Lead	**0.29**	mg/L	0.00010	0.000046	1	09/20/13 18:21	09/27/13 23:31	7439-92-1	
Zinc	**1.0**	mg/L	0.025	0.0049	5	09/20/13 18:21	09/27/13 23:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.023**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 07:05	7440-38-2	
Cadmium, Dissolved	**0.00045**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 07:05	7440-43-9	
Copper, Dissolved	**0.17**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 07:05	7440-50-8	
Lead, Dissolved	**0.00032**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 07:05	7439-92-1	
Zinc, Dissolved	**0.042**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 07:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00077**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 13:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**554**	mg/L	14.3	7.1	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**49.8**	mg/L	5.0	2.5	2		09/27/13 10:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0798-091313 **Lab ID: 10242377040** Collected: 09/16/13 12:57 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.18**	mg/L	0.00050	0.000093	1	09/20/13 18:21	09/27/13 23:43	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000032	1	09/20/13 18:21	09/27/13 23:43	7440-43-9	
Copper	**2.2**	mg/L	0.0025	0.00087	5	09/20/13 18:21	09/27/13 23:49	7440-50-8	
Lead	**1.5**	mg/L	0.00050	0.00023	5	09/20/13 18:21	09/27/13 23:49	7439-92-1	
Zinc	**4.3**	mg/L	0.10	0.020	20	09/20/13 18:21	09/30/13 09:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.022**	mg/L	0.00050	0.000093	1	09/20/13 18:19	09/28/13 07:16	7440-38-2	
Cadmium, Dissolved	**0.00054**	mg/L	0.000080	0.000032	1	09/20/13 18:19	09/28/13 07:16	7440-43-9	
Copper, Dissolved	**0.046**	mg/L	0.00050	0.00017	1	09/20/13 18:19	09/28/13 07:16	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/20/13 18:19	09/28/13 07:16	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	09/20/13 18:19	09/28/13 07:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0020**	mg/L	0.00020	0.000030	1	09/23/13 16:03	09/25/13 12:35	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/23/13 16:06	09/25/13 14:00	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1640**	mg/L	20.0	10.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.4**	mg/L	2.5	1.2	1		09/27/13 10:32	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0799-091313 **Lab ID: 10242377041** Collected: 09/16/13 13:01 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.13**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 03:41	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 03:41	7440-43-9	
Copper	**1.8**	mg/L	0.0025	0.00087	5	09/24/13 16:09	09/26/13 03:46	7440-50-8	
Lead	**1.3**	mg/L	0.00050	0.00023	5	09/24/13 16:09	09/26/13 03:46	7439-92-1	M1
Zinc	**4.1**	mg/L	0.050	0.0098	10	09/24/13 16:09	09/27/13 02:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.015**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 06:53	7440-38-2	
Cadmium, Dissolved	**0.00053**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 06:53	7440-43-9	
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 06:53	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 06:53	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 06:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0026**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 13:55	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**847**	mg/L	14.3	7.1	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.7**	mg/L	2.5	1.2	1		09/27/13 11:19	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0800-091313 **Lab ID: 10242377042** Collected: 09/16/13 13:06 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.12**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 03:52	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 03:52	7440-43-9	
Copper	**1.5**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 02:08	7440-50-8	
Lead	**0.59**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 02:08	7439-92-1	
Zinc	**4.0**	mg/L	0.050	0.0098	10	09/24/13 16:09	09/27/13 02:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.017**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 07:02	7440-38-2	
Cadmium, Dissolved	**0.0084**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 07:02	7440-43-9	
Copper, Dissolved	**0.085**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 07:02	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 07:02	7439-92-1	
Zinc, Dissolved	**1.1**	mg/L	0.025	0.0049	5	09/24/13 16:04	09/27/13 13:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00086**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 13:58	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000031J**	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:36	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0801-091313 **Lab ID: 10242377043** Collected: 09/16/13 13:09 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.17**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 03:56	7440-38-2	
Cadmium	**0.028**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 03:56	7440-43-9	
Copper	**2.4**	mg/L	0.010	0.0035	20	09/24/13 16:09	09/27/13 02:12	7440-50-8	
Lead	**0.99**	mg/L	0.0020	0.00092	20	09/24/13 16:09	09/27/13 02:12	7439-92-1	
Zinc	**6.8**	mg/L	0.10	0.020	20	09/24/13 16:09	09/27/13 02:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.014**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 07:07	7440-38-2	
Cadmium, Dissolved	**0.0086**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 07:07	7440-43-9	
Copper, Dissolved	**0.079**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 07:07	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 07:07	7439-92-1	
Zinc, Dissolved	**1.4**	mg/L	0.025	0.0049	5	09/24/13 16:04	09/27/13 13:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0014**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:10	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000031J**	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:49	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**689**	mg/L	20.0	10.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**137**	mg/L	12.5	6.2	5		09/27/13 11:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0802-091313 **Lab ID: 10242377044** Collected: 09/16/13 13:13 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.20**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 04:02	7440-38-2	
Cadmium	**0.036**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 04:02	7440-43-9	
Copper	**3.8**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 02:17	7440-50-8	
Lead	**1.6**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 02:17	7439-92-1	
Zinc	**11.5**	mg/L	0.25	0.049	50	09/24/13 16:09	09/27/13 02:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0087**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 07:12	7440-38-2	
Cadmium, Dissolved	**0.0064**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 07:12	7440-43-9	
Copper, Dissolved	**0.060**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 07:12	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 07:12	7439-92-1	
Zinc, Dissolved	**1.5**	mg/L	0.025	0.0049	5	09/24/13 16:04	09/27/13 04:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0033**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:12	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1200**	mg/L	20.0	10.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**104**	mg/L	12.5	6.2	5		09/27/13 11:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0803-091313 **Lab ID: 10242377045** Collected: 09/16/13 13:18 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.31**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 04:07	7440-38-2	
Cadmium	**0.082**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 04:07	7440-43-9	
Copper	**5.9**	mg/L	0.010	0.0035	20	09/24/13 16:09	09/27/13 02:27	7440-50-8	
Lead	**2.9**	mg/L	0.0020	0.00092	20	09/24/13 16:09	09/27/13 02:27	7439-92-1	
Zinc	**33.0**	mg/L	0.50	0.098	100	09/24/13 16:09	09/27/13 02:32	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0035**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 07:16	7440-38-2	
Cadmium, Dissolved	**0.026**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 07:16	7440-43-9	
Copper, Dissolved	**0.067**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 07:16	7440-50-8	
Lead, Dissolved	**0.0010**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 07:16	7439-92-1	
Zinc, Dissolved	**8.3**	mg/L	0.10	0.020	20	09/24/13 16:04	09/27/13 04:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0037**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:54	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2500**	mg/L	20.0	10.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**225**	mg/L	25.0	12.5	10		09/27/13 11:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0804-091313 **Lab ID: 10242377046** Collected: 09/16/13 13:23 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.17**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 04:44	7440-38-2	
Cadmium	**0.064**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 04:44	7440-43-9	
Copper	**5.3**	mg/L	0.010	0.0035	20	09/24/13 16:09	09/27/13 02:37	7440-50-8	
Lead	**2.4**	mg/L	0.0020	0.00092	20	09/24/13 16:09	09/27/13 02:37	7439-92-1	
Zinc	**24.2**	mg/L	0.50	0.098	100	09/24/13 16:09	09/27/13 02:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0076**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 07:54	7440-38-2	
Cadmium, Dissolved	**0.0029**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 07:54	7440-43-9	
Copper, Dissolved	**0.057**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 07:54	7440-50-8	
Lead, Dissolved	**0.0031**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 07:54	7439-92-1	
Zinc, Dissolved	**0.63**	mg/L	0.025	0.0049	5	09/24/13 16:04	09/27/13 04:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0018**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:17	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:56	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**3430**	mg/L	33.3	16.7	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**74.8**	mg/L	12.5	6.2	5		09/27/13 11:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0805-091313 **Lab ID: 10242377047** Collected: 09/16/13 13:26 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.27**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 04:49	7440-38-2	
Cadmium	**0.061**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 04:49	7440-43-9	
Copper	**5.8**	mg/L	0.010	0.0035	20	09/24/13 16:09	09/27/13 02:46	7440-50-8	
Lead	**3.5**	mg/L	0.0020	0.00092	20	09/24/13 16:09	09/27/13 02:46	7439-92-1	
Zinc	**24.4**	mg/L	0.50	0.098	100	09/24/13 16:09	09/27/13 03:06	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0081**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 07:58	7440-38-2	
Cadmium, Dissolved	**0.0030**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 07:58	7440-43-9	
Copper, Dissolved	**0.060**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 07:58	7440-50-8	
Lead, Dissolved	**0.0035**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 07:58	7439-92-1	
Zinc, Dissolved	**0.62**	mg/L	0.025	0.0049	5	09/24/13 16:04	09/27/13 04:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0030**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:20	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 12:58	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**3010**	mg/L	33.3	16.7	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**74.8**	mg/L	12.5	6.2	5		09/27/13 11:50	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0806-091313 **Lab ID: 10242377048** Collected: 09/16/13 13:28 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.00011J**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 04:55	7440-38-2	B
Cadmium	ND	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 04:55	7440-43-9	
Copper	**0.0011**	mg/L	0.00050	0.00017	1	09/24/13 16:09	09/26/13 04:55	7440-50-8	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 04:55	7439-92-1	
Zinc	**0.0030J**	mg/L	0.0050	0.00098	1	09/24/13 16:09	09/26/13 04:55	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.00012J**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:03	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:03	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:03	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:03	7439-92-1	
Zinc, Dissolved	**0.0014J**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:03	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:22	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:01	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/27/13 11:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0807-091313 **Lab ID: 10242377049** Collected: 09/16/13 13:33 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.059**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:00	7440-38-2	
Cadmium	**0.010**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:00	7440-43-9	
Copper	**0.62**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 03:11	7440-50-8	
Lead	**0.87**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 03:11	7439-92-1	
Zinc	**3.6**	mg/L	0.050	0.0098	10	09/24/13 16:09	09/27/13 03:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0040**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:08	7440-38-2	
Cadmium, Dissolved	**0.00034**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:08	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:08	7440-50-8	
Lead, Dissolved	**0.0046**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:08	7439-92-1	
Zinc, Dissolved	**0.11**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00039**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00060	0.000090	1	09/26/13 13:00	09/30/13 13:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**934**	mg/L	20.0	10.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.3**	mg/L	2.5	1.2	1		09/27/13 11:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0808-091313 **Lab ID: 10242377050** Collected: 09/16/13 13:36 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.077**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:05	7440-38-2	
Cadmium	**0.0078**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:05	7440-43-9	
Copper	**0.51**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 03:16	7440-50-8	
Lead	**2.2**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 03:16	7439-92-1	
Zinc	**3.5**	mg/L	0.050	0.0098	10	09/24/13 16:09	09/27/13 03:16	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:12	7440-38-2	
Cadmium, Dissolved	**0.00093**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:12	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:12	7440-50-8	
Lead, Dissolved	**0.013**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:12	7439-92-1	
Zinc, Dissolved	**0.19**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00044**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:27	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000036J**	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:11	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**740**	mg/L	14.3	7.1	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.8**	mg/L	2.5	1.2	1		09/27/13 11:28	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0809-091313 **Lab ID: 10242377051** Collected: 09/16/13 13:39 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.16**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:10	7440-38-2	
Cadmium	**0.033**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:10	7440-43-9	
Copper	**1.7**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 03:27	7440-50-8	M1
Lead	**3.3**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 03:27	7439-92-1	M1
Zinc	**12.8**	mg/L	0.25	0.049	50	09/24/13 16:09	09/27/13 03:32	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:17	7440-38-2	
Cadmium, Dissolved	**0.00064**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:17	7440-43-9	
Copper, Dissolved	**0.053**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:17	7440-50-8	
Lead, Dissolved	**0.0052**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:17	7439-92-1	
Zinc, Dissolved	**0.097**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00097**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:34	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2960**	mg/L	20.0	10.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.1**	mg/L	2.5	1.2	1		09/27/13 11:28	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0810-091313 **Lab ID: 10242377052** Collected: 09/16/13 13:42 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.074**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:16	7440-38-2	
Cadmium	**0.0072**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:16	7440-43-9	
Copper	**0.71**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 03:42	7440-50-8	
Lead	**0.67**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 03:42	7439-92-1	
Zinc	**3.0**	mg/L	0.050	0.0098	10	09/24/13 16:09	09/27/13 03:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00051**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:37	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0811-091313 **Lab ID: 10242377053** Collected: 09/16/13 13:47 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:21	7440-38-2	
Cadmium	**0.00075**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:21	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	09/24/13 16:09	09/26/13 05:21	7440-50-8	
Lead	**0.079**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 05:21	7439-92-1	
Zinc	**0.24**	mg/L	0.0050	0.00098	1	09/24/13 16:09	09/26/13 05:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0077**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:27	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:27	7440-43-9	
Copper, Dissolved	**0.033**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:27	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:27	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00035**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:39	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000035J**	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:16	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**128**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.9**	mg/L	2.5	1.2	1		09/27/13 11:28	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0812-091313 **Lab ID: 10242377054** Collected: 09/16/13 13:50 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:26	7440-38-2	
Cadmium	**0.00056**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:26	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	09/24/13 16:09	09/26/13 05:26	7440-50-8	
Lead	**0.032**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 05:26	7439-92-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	09/24/13 16:09	09/26/13 05:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:32	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:32	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:32	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:32	7439-92-1	
Zinc, Dissolved	**0.030**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000092J**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:42	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**83.7**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.6**	mg/L	2.5	1.2	1		09/27/13 11:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0813-091313 **Lab ID: 10242377055** Collected: 09/16/13 13:53 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:52	7440-38-2	
Cadmium	**0.00065**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:52	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	09/24/13 16:09	09/26/13 05:52	7440-50-8	
Lead	**0.037**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 05:52	7439-92-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	09/24/13 16:09	09/26/13 05:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0086**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:37	7440-38-2	
Cadmium, Dissolved	**0.00028**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:37	7440-43-9	
Copper, Dissolved	**0.050**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:37	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:37	7439-92-1	
Zinc, Dissolved	**0.034**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000096J**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:21	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**66.6**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.9**	mg/L	2.5	1.2	1		09/27/13 11:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0814-091313 **Lab ID: 10242377056** Collected: 09/16/13 13:57 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 05:57	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 05:57	7440-43-9	
Copper	**0.22**	mg/L	0.00050	0.00017	1	09/24/13 16:09	09/26/13 05:57	7440-50-8	
Lead	**0.093**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 05:57	7439-92-1	
Zinc	**0.31**	mg/L	0.0050	0.00098	1	09/24/13 16:09	09/26/13 05:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 08:58	7440-38-2	
Cadmium, Dissolved	**0.00043**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 08:58	7440-43-9	
Copper, Dissolved	**0.057**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 08:58	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 08:58	7439-92-1	
Zinc, Dissolved	**0.036**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 08:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00021**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:47	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:23	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**108**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.0**	mg/L	2.5	1.2	1		09/27/13 11:33	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0815-091313 **Lab ID: 10242377057** Collected: 09/16/13 14:00 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.043**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 06:02	7440-38-2	
Cadmium	**0.0028**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 06:02	7440-43-9	
Copper	**0.41**	mg/L	0.00050	0.00017	1	09/24/13 16:09	09/26/13 06:02	7440-50-8	
Lead	**0.24**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 06:02	7439-92-1	
Zinc	**0.74**	mg/L	0.025	0.0049	5	09/24/13 16:09	09/27/13 03:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 09:03	7440-38-2	
Cadmium, Dissolved	**0.00052**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 09:03	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 09:03	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 09:03	7439-92-1	
Zinc, Dissolved	**0.031**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 09:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00065**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:54	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.000031J**	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:31	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**251**	mg/L	10.0	5.0	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.5**	mg/L	2.5	1.2	1		09/27/13 11:33	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0816-091313 **Lab ID: 10242377058** Collected: 09/16/13 14:04 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.059**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 06:07	7440-38-2	
Cadmium	**0.0057**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 06:07	7440-43-9	
Copper	**0.73**	mg/L	0.0025	0.00087	5	09/24/13 16:09	09/27/13 03:52	7440-50-8	
Lead	**0.40**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 06:07	7439-92-1	
Zinc	**1.5**	mg/L	0.025	0.0049	5	09/24/13 16:09	09/27/13 03:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 09:07	7440-38-2	
Cadmium, Dissolved	**0.00056**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 09:07	7440-43-9	
Copper, Dissolved	**0.048**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 09:07	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 09:07	7439-92-1	
Zinc, Dissolved	**0.031**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 09:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00087**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:57	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:33	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**306**	mg/L	14.3	7.1	1		09/20/13 16:44		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.4**	mg/L	2.5	1.2	1		09/27/13 11:33	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0817-091313 **Lab ID: 10242377059** Collected: 09/16/13 14:07 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.040**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 06:12	7440-38-2	
Cadmium	**0.0044**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 06:12	7440-43-9	
Copper	**0.58**	mg/L	0.0025	0.00087	5	09/24/13 16:09	09/27/13 04:12	7440-50-8	
Lead	**0.38**	mg/L	0.00010	0.000046	1	09/24/13 16:09	09/26/13 06:12	7439-92-1	
Zinc	**1.2**	mg/L	0.025	0.0049	5	09/24/13 16:09	09/27/13 04:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0074**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 09:12	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 09:12	7440-43-9	
Copper, Dissolved	**0.031**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 09:12	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 09:12	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 09:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 14:59	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:35	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**755**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.6**	mg/L	2.5	1.2	1		09/27/13 11:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0818-091313 **Lab ID: 10242377060** Collected: 09/16/13 14:10 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.069**	mg/L	0.00050	0.000093	1	09/24/13 16:09	09/26/13 06:17	7440-38-2	
Cadmium	**0.0066**	mg/L	0.000080	0.000032	1	09/24/13 16:09	09/26/13 06:17	7440-43-9	
Copper	**1.0**	mg/L	0.0050	0.0017	10	09/24/13 16:09	09/27/13 04:22	7440-50-8	
Lead	**0.60**	mg/L	0.0010	0.00046	10	09/24/13 16:09	09/27/13 04:22	7439-92-1	
Zinc	**2.1**	mg/L	0.050	0.0098	10	09/24/13 16:09	09/27/13 04:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0069**	mg/L	0.00050	0.000093	1	09/24/13 16:04	09/26/13 09:17	7440-38-2	
Cadmium, Dissolved	**0.00012**	mg/L	0.000080	0.000032	1	09/24/13 16:04	09/26/13 09:17	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	09/24/13 16:04	09/26/13 09:17	7440-50-8	
Lead, Dissolved	**0.00097**	mg/L	0.00010	0.000046	1	09/24/13 16:04	09/26/13 09:17	7439-92-1	
Zinc, Dissolved	**0.0088**	mg/L	0.0050	0.00098	1	09/24/13 16:04	09/26/13 09:17	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0017**	mg/L	0.00020	0.000030	1	09/26/13 13:05	09/30/13 15:01	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/26/13 13:00	09/30/13 13:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2000**	mg/L	20.0	10.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.1**	mg/L	2.5	1.2	1		09/27/13 11:33	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0819-091313 **Lab ID: 10242377061** Collected: 09/16/13 14:19 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.023**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 18:02	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 18:02	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 18:02	7440-50-8	
Lead	**0.080**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 18:02	7439-92-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	09/25/13 10:17	09/30/13 18:02	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:19	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:19	7440-43-9	
Copper, Dissolved	**0.049**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:19	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:19	7439-92-1	
Zinc, Dissolved	**0.028**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:13	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:05	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**132**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**15.0**	mg/L	2.5	1.2	1		09/27/13 11:33	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0820-091313 **Lab ID: 10242377062** Collected: 09/16/13 14:22 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 18:11	7440-38-2	
Cadmium	**0.00064**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 18:11	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 18:11	7440-50-8	
Lead	**0.037**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 18:11	7439-92-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	09/25/13 10:17	09/30/13 18:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:30	7440-38-2	
Cadmium, Dissolved	**0.00028**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:30	7440-43-9	
Copper, Dissolved	**0.056**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:30	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:30	7439-92-1	
Zinc, Dissolved	**0.032**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000070J**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**62.0**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.0**	mg/L	2.5	1.2	1		09/27/13 11:34	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0821-091313 **Lab ID: 10242377063** Collected: 09/16/13 14:26 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 18:16	7440-38-2	
Cadmium	**0.00055**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 18:16	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 18:16	7440-50-8	
Lead	**0.037**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 18:16	7439-92-1	
Zinc	**0.17**	mg/L	0.0050	0.00098	1	09/25/13 10:17	09/30/13 18:16	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0083**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:33	7440-38-2	
Cadmium, Dissolved	**0.00020**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:33	7440-43-9	
Copper, Dissolved	**0.051**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:33	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:33	7439-92-1	
Zinc, Dissolved	**0.038**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000090J**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:17	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**81.2**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**12.8**	mg/L	2.5	1.2	1		09/27/13 12:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0822-091313 **Lab ID: 10242377064** Collected: 09/16/13 14:30 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 18:21	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 18:21	7440-43-9	
Copper	**0.23**	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 18:21	7440-50-8	
Lead	**0.074**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 18:21	7439-92-1	
Zinc	**0.27**	mg/L	0.0050	0.00098	1	09/25/13 10:17	09/30/13 18:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:36	7440-38-2	
Cadmium, Dissolved	**0.00037**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:36	7440-43-9	
Copper, Dissolved	**0.067**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:36	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:36	7439-92-1	
Zinc, Dissolved	**0.035**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:27	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:19	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**126**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.1**	mg/L	2.5	1.2	1		09/27/13 12:47	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0823-091313 **Lab ID: 10242377065** Collected: 09/16/13 14:34 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.046**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 18:26	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 18:26	7440-43-9	
Copper	**0.40**	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 18:26	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 18:26	7439-92-1	
Zinc	**0.66**	mg/L	0.025	0.0049	5	09/25/13 10:17	09/30/13 19:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:39	7440-38-2	
Cadmium, Dissolved	**0.00047**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:39	7440-43-9	
Copper, Dissolved	**0.065**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:39	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:39	7439-92-1	
Zinc, Dissolved	**0.039**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00050**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:29	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:21	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**233**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.1**	mg/L	2.5	1.2	1		09/27/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0824-091313 **Lab ID: 10242377066** Collected: 09/16/13 14:37 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.072**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 19:07	7440-38-2	
Cadmium	**0.0058**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 19:07	7440-43-9	
Copper	**0.76**	mg/L	0.0025	0.00087	5	09/25/13 10:17	09/30/13 19:13	7440-50-8	
Lead	**0.51**	mg/L	0.00050	0.00023	5	09/25/13 10:17	09/30/13 19:13	7439-92-1	
Zinc	**1.5**	mg/L	0.025	0.0049	5	09/25/13 10:17	09/30/13 19:13	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.010**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:50	7440-38-2	
Cadmium, Dissolved	**0.00051**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:50	7440-43-9	
Copper, Dissolved	**0.054**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:50	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:50	7439-92-1	
Zinc, Dissolved	**0.028**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0010**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:31	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:24	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**462**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.9**	mg/L	2.5	1.2	1		09/27/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0825-091313 **Lab ID: 10242377067** Collected: 09/16/13 14:42 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.082**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 19:18	7440-38-2	
Cadmium	**0.0071**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 19:18	7440-43-9	
Copper	**0.95**	mg/L	0.0025	0.00087	5	09/25/13 10:17	09/30/13 19:23	7440-50-8	
Lead	**0.70**	mg/L	0.00050	0.00023	5	09/25/13 10:17	09/30/13 19:23	7439-92-1	
Zinc	**2.0**	mg/L	0.025	0.0049	5	09/25/13 10:17	09/30/13 19:23	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0088**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:53	7440-38-2	
Cadmium, Dissolved	**0.00035**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:53	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:53	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:53	7439-92-1	
Zinc, Dissolved	**0.019**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0015**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:26	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**881**	mg/L	20.0	10.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.2**	mg/L	2.5	1.2	1		09/27/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0826-091313 **Lab ID: 10242377068** Collected: 09/16/13 14:46 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 19:27	7440-38-2	
Cadmium	**0.0026**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 19:27	7440-43-9	
Copper	**0.49**	mg/L	0.0025	0.00087	5	09/25/13 10:17	09/30/13 19:32	7440-50-8	
Lead	**0.16**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 19:27	7439-92-1	
Zinc	**0.86**	mg/L	0.025	0.0049	5	09/25/13 10:17	09/30/13 19:32	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0061**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:56	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:56	7440-43-9	
Copper, Dissolved	**0.022**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:56	7440-50-8	
Lead, Dissolved	**0.00065**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:56	7439-92-1	
Zinc, Dissolved	**0.056**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00015J**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:35	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1010**	mg/L	10.0	5.0	1		09/30/13 08:09		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.6**	mg/L	2.5	1.2	1		09/27/13 13:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0827-091313 **Lab ID: 10242377069** Collected: 09/16/13 14:49 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 19:37	7440-38-2	
Cadmium	**0.0025**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 19:37	7440-43-9	
Copper	**0.36**	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 19:37	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 19:37	7439-92-1	
Zinc	**0.74**	mg/L	0.025	0.0049	5	09/25/13 10:17	10/01/13 12:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0061**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 13:58	7440-38-2	
Cadmium, Dissolved	**0.00023**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 13:58	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 13:58	7440-50-8	
Lead, Dissolved	**0.0028**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 13:58	7439-92-1	
Zinc, Dissolved	**0.10**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 13:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00026**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:37	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2410**	mg/L	33.3	16.7	1		09/20/13 16:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.0**	mg/L	2.5	1.2	1		09/27/13 12:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0828-091313 **Lab ID: 10242377070** Collected: 09/16/13 14:51 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 19:47	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 19:47	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	09/25/13 10:17	09/30/13 19:47	7440-50-8	
Lead	**0.000075J**	mg/L	0.00010	0.000046	1	09/25/13 10:17	09/30/13 19:47	7439-92-1	
Zinc	**0.0021J**	mg/L	0.0050	0.00098	1	09/25/13 10:17	09/30/13 19:47	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 14:01	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 14:01	7440-43-9	
Copper, Dissolved	ND	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 14:01	7440-50-8	
Lead, Dissolved	**0.000058J**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 14:01	7439-92-1	
Zinc, Dissolved	**0.0015J**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 14:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:36	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/20/13 16:38		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		09/27/13 12:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0829-091313 **Lab ID: 10242377071** Collected: 09/16/13 14:55 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.12**	mg/L	0.00050	0.000093	1	09/25/13 10:17	09/30/13 20:07	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000032	1	09/25/13 10:17	09/30/13 20:07	7440-43-9	
Copper	**2.0**	mg/L	0.0025	0.00087	5	09/25/13 10:17	09/30/13 20:12	7440-50-8	M1
Lead	**1.3**	mg/L	0.00050	0.00023	5	09/25/13 10:17	09/30/13 20:12	7439-92-1	M1
Zinc	**7.9**	mg/L	0.10	0.020	20	09/25/13 10:17	10/01/13 12:20	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0050**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 14:04	7440-38-2	
Cadmium, Dissolved	**0.00035**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 14:04	7440-43-9	
Copper, Dissolved	**0.067**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 14:04	7440-50-8	
Lead, Dissolved	**0.0027**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 14:04	7439-92-1	
Zinc, Dissolved	**0.35**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 14:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0012**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:46	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:38	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**1540**	mg/L	20.0	10.0	1		09/20/13 16:39		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.2**	mg/L	2.5	1.2	1		09/27/13 12:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0830-091313 **Lab ID: 10242377072** Collected: 09/16/13 14:58 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.26**	mg/L	0.00050	0.000093	1	09/25/13 10:17	10/01/13 12:25	7440-38-2	
Cadmium	**0.028**	mg/L	0.000080	0.000032	1	09/25/13 10:17	10/01/13 12:25	7440-43-9	
Copper	**3.3**	mg/L	0.010	0.0035	20	09/25/13 10:17	10/01/13 12:30	7440-50-8	
Lead	**2.2**	mg/L	0.0020	0.00092	20	09/25/13 10:17	10/01/13 12:30	7439-92-1	
Zinc	**6.5**	mg/L	0.10	0.020	20	09/25/13 10:17	10/01/13 12:30	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.022**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 14:10	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 14:10	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 14:10	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 14:10	7439-92-1	
Zinc, Dissolved	**0.016**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 14:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0018**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2620**	mg/L	20.0	10.0	1		09/20/13 16:39		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.1**	mg/L	2.5	1.2	1		09/27/13 12:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Sample: SD0831-091313 **Lab ID: 10242377073** Collected: 09/16/13 15:02 Received: 09/18/13 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.29**	mg/L	0.00050	0.000093	1	09/25/13 10:17	10/01/13 12:35	7440-38-2	
Cadmium	**0.12**	mg/L	0.000080	0.000032	1	09/25/13 10:17	10/01/13 12:35	7440-43-9	
Copper	**16.2**	mg/L	0.10	0.035	200	09/25/13 10:17	10/01/13 12:50	7440-50-8	
Lead	**1.8**	mg/L	0.00050	0.00023	5	09/25/13 10:17	10/01/13 12:45	7439-92-1	
Zinc	**63.7**	mg/L	1.0	0.20	200	09/25/13 10:17	10/01/13 12:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0097**	mg/L	0.00050	0.000093	1	09/24/13 09:52	09/30/13 14:13	7440-38-2	
Cadmium, Dissolved	**0.00064**	mg/L	0.000080	0.000032	1	09/24/13 09:52	09/30/13 14:13	7440-43-9	
Copper, Dissolved	**0.059**	mg/L	0.00050	0.00017	1	09/24/13 09:52	09/30/13 14:13	7440-50-8	
Lead, Dissolved	**0.0033**	mg/L	0.00010	0.000046	1	09/24/13 09:52	09/30/13 14:13	7439-92-1	
Zinc, Dissolved	**0.42**	mg/L	0.0050	0.00098	1	09/24/13 09:52	09/30/13 14:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00082**	mg/L	0.00020	0.000030	1	09/25/13 08:44	09/25/13 14:50	7439-97-6	M1
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	09/25/13 11:25	09/25/13 16:42	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**2640**	mg/L	20.0	10.0	1		09/20/13 16:39		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**21.3**	mg/L	2.5	1.2	1		09/27/13 12:55	14808-79-8	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9280 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

METHOD BLANK: 1528113 Matrix: Water
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/25/13 11:15	

LABORATORY CONTROL SAMPLE: 1528114

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0054	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528115 1528116

Parameter	Units	10242377022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00091	.005	.005	0.0051	0.0066	84	113	85-115	25	20	M1,R1

MATRIX SPIKE SAMPLE: 1528117

Parameter	Units	10242377040 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0020	.005	0.0069	98	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9281 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377052, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

METHOD BLANK: 1528118 Matrix: Water
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377052, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/30/13 13:50	

LABORATORY CONTROL SAMPLE: 1528119

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528120 1528121

Parameter	Units	10242377042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00086	.005	.005	0.0056	0.0056	96	94	85-115	2	20	

MATRIX SPIKE SAMPLE: 1528122

Parameter	Units	10242377060 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0017	.005	0.0064	93	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9282 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

METHOD BLANK: 1528125 Matrix: Water
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/25/13 14:09	

LABORATORY CONTROL SAMPLE: 1528126

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528127 1528128

Parameter	Units	10242377062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000070J	.005	.005	0.0048	0.0047	94	92	85-115	1	20	

MATRIX SPIKE SAMPLE: 1528129

Parameter	Units	10242377073 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00082	.005	0.0033	50	85-115	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9347 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

METHOD BLANK: 1534074 Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000045J	0.00020	09/26/13 09:43	

LABORATORY CONTROL SAMPLE: 1534075

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0053	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534076 1534077

Parameter	Units	10242377002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00037	.005	.005	0.0054	0.0058	101	108	85-115	6	20	

MATRIX SPIKE SAMPLE: 1534078

Parameter	Units	10242377020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00070	.005	0.0061	109	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9276 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

METHOD BLANK: 1528093 — Matrix: Water
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/25/13 12:47	

LABORATORY CONTROL SAMPLE: 1528094

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528095 1528096

Parameter	Units	10242377022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0048	0.0047	97	94	85-115	2	20	

MATRIX SPIKE SAMPLE: 1528097

Parameter	Units	10242377040 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0054	108	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9277 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

METHOD BLANK: 1528098 Matrix: Water
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/30/13 12:29	

LABORATORY CONTROL SAMPLE: 1528099

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528100 1528101

Parameter	Units	10242377042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	0.000031J	.005	.005	0.0050	0.0047	99	94	85-115	5	20	

MATRIX SPIKE SAMPLE: 1528102

Parameter	Units	10242377060 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0049	98	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9278 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

METHOD BLANK: 1528103 — Matrix: Water
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/25/13 16:01	

LABORATORY CONTROL SAMPLE: 1528104

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0054	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528105 1528106

Parameter	Units	10242377062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0053	0.0051	105	103	85-115	2	20	

MATRIX SPIKE SAMPLE: 1528107

Parameter	Units	10242377073 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0048	97	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MERP/9348 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

METHOD BLANK: 1534112 | Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	09/26/13 11:07	

LABORATORY CONTROL SAMPLE: 1534113

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE SAMPLE: 1534114

Parameter	Units	10242377020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0053	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534470 | 1534471

Parameter	Units	10242377003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0053	0.0053	106	107	85-115	.8	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41949 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

METHOD BLANK: 1528020 — Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/25/13 17:29	
Cadmium	mg/L	ND	0.000080	09/25/13 17:29	
Calcium	ug/L	ND	20.0	09/25/13 17:29	
Copper	mg/L	ND	0.00050	09/25/13 17:29	
Iron	ug/L	ND	50.0	09/25/13 17:29	
Lead	mg/L	ND	0.00010	09/25/13 17:29	
Magnesium	ug/L	ND	5.0	09/25/13 17:29	
Manganese	ug/L	ND	0.50	09/25/13 17:29	
Potassium	ug/L	ND	20.0	09/25/13 17:29	
Sodium	ug/L	ND	50.0	09/25/13 17:29	
Zinc	mg/L	ND	0.0050	09/25/13 17:29	

LABORATORY CONTROL SAMPLE: 1528021

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.082	103	85-115	
Calcium	ug/L	1000	1030	103	85-115	
Copper	mg/L	.08	0.088	110	85-115	
Iron	ug/L	1000	1010	101	85-115	
Lead	mg/L	.08	0.081	101	85-115	
Magnesium	ug/L	1000	1030	103	85-115	
Manganese	ug/L	80	81.6	102	85-115	
Potassium	ug/L	1000	1040	104	85-115	
Sodium	ug/L	1000	1020	102	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528022 — 1528023

Parameter	Units	10242377001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.017	.08	.08	0.098	0.094	101	97	70-130	3	20	
Cadmium	mg/L	0.0010	.08	.08	0.083	0.082	103	101	70-130	2	20	
Calcium	ug/L	16900	1000	1000	17900	17800	101	88	70-130	.7	20	
Copper	mg/L	0.17	.08	.08	0.26	0.25	112	104	70-130	3	20	
Iron	ug/L	3780	1000	1000	4970	4890	119	112	70-130	1	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1528022 1528023

Parameter	Units	10242377001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.084	.08	.08	0.17	0.17	107	102	70-130	2	20	
Magnesium	ug/L	4370	1000	1000	5480	5310	111	94	70-130	3	20	
Manganese	ug/L	178	80	80	261	259	104	100	70-130	1	20	
Potassium	ug/L	3300	1000	1000	4590	4500	128	120	70-130	2	20	
Sodium	ug/L	4580	1000	1000	5680	5610	110	103	70-130	1	20	
Zinc	mg/L	0.28	.08	.08	0.36	0.36	108	97	70-130	2	20	

MATRIX SPIKE SAMPLE: 1528024

Parameter	Units	10242377011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.028	.08	0.11	99	70-130	
Cadmium	mg/L	0.0020	.08	0.084	103	70-130	
Calcium	ug/L	17900	1000	18800	94	70-130	
Copper	mg/L	0.23	.08	0.31	107	70-130	
Iron	ug/L	7130	1000	8450	132	70-130	
Lead	mg/L	0.23	.08	0.32	105	70-130	
Magnesium	ug/L	4150	1000	5270	112	70-130	
Manganese	ug/L	397	80	481	106	70-130	
Potassium	ug/L	4780	1000	6060	128	70-130	
Sodium	ug/L	2690	1000	3760	107	70-130	
Zinc	mg/L	0.68	.08	0.75	84	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41977 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

METHOD BLANK: 1529129 Matrix: Water
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	0.00015J	0.00050	09/27/13 17:52	
Cadmium	mg/L	ND	0.000080	09/27/13 17:52	
Calcium	mg/L	ND	0.020	09/27/13 17:52	
Copper	mg/L	ND	0.00050	09/27/13 17:52	
Iron	mg/L	ND	0.050	09/27/13 17:52	
Lead	mg/L	ND	0.00010	09/27/13 17:52	
Magnesium	mg/L	ND	0.0050	09/27/13 17:52	
Manganese	mg/L	0.00022J	0.00050	09/27/13 17:52	
Potassium	mg/L	ND	0.020	09/27/13 17:52	ES
Sodium	mg/L	ND	0.050	09/27/13 17:52	
Zinc	mg/L	0.0011J	0.0050	09/27/13 17:52	

LABORATORY CONTROL SAMPLE: 1529130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.080	100	85-115	
Iron	mg/L	1	1.1	106	85-115	
Lead	mg/L	.08	0.086	108	85-115	
Magnesium	mg/L	1	1.0	101	85-115	
Manganese	mg/L	.08	0.081	102	85-115	
Potassium	mg/L	1	1.0	101	85-115	
Sodium	mg/L	1	0.97	97	85-115	
Zinc	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529131 1529132

Parameter	Units	10242377021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.033	.08	.08	0.11	0.11	99	99	70-130	.2	20	
Cadmium	mg/L	0.0023	.08	.08	0.083	0.083	101	101	70-130	.1	20	
Calcium	mg/L		1	1	27.9	27.6	152	126	70-130	.9	20	
Copper	mg/L	0.18	.08	.08	0.27	0.27	107	110	70-130	.8	20	
Iron	mg/L		1	1	12.5	12.3	199	182	70-130	1	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529131 1529132

Parameter	Units	10242377021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.31	.08	.08	0.40	0.40	116	114	70-130	.4	20	
Magnesium	mg/L		1	1	7.4	7.3	146	137	70-130	1	20	
Manganese	mg/L		.08	.08	1.3	1.3	148	137	70-130	.7	20	E
Potassium	mg/L		1	1	7.5	7.4	136	133	70-130	.3	20	
Sodium	mg/L		1	1	4.7	4.7	118	116	70-130	.3	20	
Zinc	mg/L	0.69	.08	.08	0.78	0.77	110	106	70-130	.4	20	

MATRIX SPIKE SAMPLE: 1529133

Parameter	Units	10242377033 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	.08	0.081	102	70-130	
Cadmium	mg/L	ND	.08	0.082	102	70-130	
Calcium	mg/L		1	1.1	114	70-130	
Copper	mg/L	ND	.08	0.086	107	70-130	
Iron	mg/L		1	1.1	106	70-130	
Lead	mg/L	0.000053J	.08	0.080	100	70-130	
Magnesium	mg/L		1	1.0	102	70-130	
Manganese	mg/L		.08	0.082	102	70-130	
Potassium	mg/L		1	1.1	108	70-130	
Sodium	mg/L		1	1.0	104	70-130	
Zinc	mg/L	0.0011J	.08	0.084	104	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41988 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377052, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

METHOD BLANK: 1529498 Matrix: Water
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377052, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	0.00012J	0.00050	09/26/13 03:37	
Cadmium	mg/L	ND	0.000080	09/26/13 03:37	
Copper	mg/L	ND	0.00050	09/26/13 03:37	
Lead	mg/L	ND	0.00010	09/26/13 03:37	
Zinc	mg/L	0.0012J	0.0050	09/26/13 03:37	

LABORATORY CONTROL SAMPLE: 1529499

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.079	98	85-115	
Cadmium	mg/L	.08	0.080	101	85-115	
Copper	mg/L	.08	0.079	99	85-115	
Lead	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529500 1529501

Parameter	Units	10242377041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.13	.08	.08	0.21	0.21	103	105	70-130	.7	20	
Cadmium	mg/L	0.017	.08	.08	0.096	0.095	99	98	70-130	1	20	
Copper	mg/L	1.8	.08	.08	1.9	1.9	94	106	70-130	.5	20	E
Lead	mg/L	1.3	.08	.08	1.2	1.2	-58	-29	70-130	2	20	E,M1
Zinc	mg/L	4.1	.08	.08	4.2	4.2	100	128	70-130	.5	20	E

MATRIX SPIKE SAMPLE: 1529502

Parameter	Units	10242377051 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.16	.08	0.24	102	70-130	
Cadmium	mg/L	0.033	.08	0.11	92	70-130	
Copper	mg/L	1.7	.08	1.8	40	70-130	E,M1
Lead	mg/L	3.3	.08	3.6	313	70-130	E,M1
Zinc	mg/L	12.8	.08	11.5	-1600	70-130	E,M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41989 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

METHOD BLANK: 1529507 — Matrix: Water
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	09/30/13 17:57	
Cadmium	mg/L	ND	0.000080	09/30/13 17:57	
Copper	mg/L	ND	0.00050	09/30/13 17:57	
Lead	mg/L	ND	0.00010	09/30/13 17:57	
Zinc	mg/L	0.0011J	0.0050	09/30/13 17:57	

LABORATORY CONTROL SAMPLE: 1529508

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.084	105	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Copper	mg/L	.08	0.078	98	85-115	
Lead	mg/L	.08	0.082	103	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529509 1529510

Parameter	Units	10242377061 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.023	.08	.08	0.11	0.11	106	106	70-130	.3	20	
Cadmium	mg/L	0.0011	.08	.08	0.084	0.083	103	103	70-130	.5	20	
Copper	mg/L	0.17	.08	.08	0.26	0.25	106	102	70-130	1	20	
Lead	mg/L	0.080	.08	.08	0.17	0.17	110	112	70-130	.7	20	
Zinc	mg/L	0.28	.08	.08	0.37	0.37	112	111	70-130	.2	20	

MATRIX SPIKE SAMPLE: 1529511

Parameter	Units	10242377071 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.12	.08	0.21	110	70-130	
Cadmium	mg/L	0.020	.08	0.10	104	70-130	
Copper	mg/L	2.0	.08	2.1	146	70-130	E,M1
Lead	mg/L	1.3	.08	1.3	-37	70-130	E,M1
Zinc	mg/L	7.9	.08	8.9	1190	70-130	E,M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41944 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

METHOD BLANK: 1527982 — Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/25/13 23:36	
Cadmium, Dissolved	mg/L	ND	0.000080	09/25/13 23:36	
Copper, Dissolved	mg/L	ND	0.00050	09/25/13 23:36	
Lead, Dissolved	mg/L	ND	0.00010	09/25/13 23:36	
Zinc, Dissolved	mg/L	ND	0.0050	09/25/13 23:36	

LABORATORY CONTROL SAMPLE: 1527983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.082	103	85-115	
Cadmium, Dissolved	mg/L	.08	0.082	102	85-115	
Copper, Dissolved	mg/L	.08	0.088	110	85-115	
Lead, Dissolved	mg/L	.08	0.082	102	85-115	
Zinc, Dissolved	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1527984 1527985

Parameter	Units	10242377001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0080	.08	.08	0.092	0.091	105	103	70-130	1	20	
Cadmium, Dissolved	mg/L	0.00029	.08	.08	0.084	0.085	104	105	70-130	1	20	
Copper, Dissolved	mg/L	0.051	.08	.08	0.13	0.13	104	103	70-130	.5	20	
Lead, Dissolved	mg/L	0.0025	.08	.08	0.087	0.088	106	107	70-130	1	20	
Zinc, Dissolved	mg/L	0.039	.08	.08	0.12	0.12	99	99	70-130	.1	20	

MATRIX SPIKE SAMPLE: 1527986

Parameter	Units	10242377011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0088	.08	0.094	106	70-130	
Cadmium, Dissolved	mg/L	0.00026	.08	0.084	104	70-130	
Copper, Dissolved	mg/L	0.062	.08	0.13	83	70-130	
Lead, Dissolved	mg/L	0.0040	.08	0.086	103	70-130	
Zinc, Dissolved	mg/L	0.058	.08	0.13	90	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41976 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

METHOD BLANK: 1529117 — Matrix: Water
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/28/13 02:19	
Cadmium, Dissolved	mg/L	ND	0.000080	09/28/13 02:19	
Copper, Dissolved	mg/L	ND	0.00050	09/28/13 02:19	
Lead, Dissolved	mg/L	ND	0.00010	09/28/13 02:19	
Zinc, Dissolved	mg/L	ND	0.0050	09/28/13 02:19	

LABORATORY CONTROL SAMPLE: 1529118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.082	103	85-115	
Cadmium, Dissolved	mg/L	.08	0.082	103	85-115	
Copper, Dissolved	mg/L	.08	0.083	103	85-115	
Lead, Dissolved	mg/L	.08	0.084	105	85-115	
Zinc, Dissolved	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529119 1529120

Parameter	Units	10242377021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.014	.08	.08	0.098	0.099	104	106	70-130	2	20	
Cadmium, Dissolved	mg/L	0.00069	.08	.08	0.083	0.084	103	104	70-130	2	20	
Copper, Dissolved	mg/L	0.068	.08	.08	0.16	0.16	112	112	70-130	.3	20	
Lead, Dissolved	mg/L	0.075	.08	.08	0.16	0.17	109	114	70-130	3	20	
Zinc, Dissolved	mg/L	0.17	.08	.08	0.26	0.26	104	108	70-130	1	20	

MATRIX SPIKE SAMPLE: 1529121

Parameter	Units	10242377033 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	ND	.08	0.082	102	70-130	
Cadmium, Dissolved	mg/L	ND	.08	0.083	103	70-130	
Copper, Dissolved	mg/L	ND	.08	0.083	104	70-130	
Lead, Dissolved	mg/L	ND	.08	0.093	116	70-130	
Zinc, Dissolved	mg/L	0.0013J	.08	0.083	102	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41986 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

METHOD BLANK: 1529488 — Matrix: Water
Associated Lab Samples: 10242377041, 10242377042, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/26/13 06:48	
Cadmium, Dissolved	mg/L	ND	0.000080	09/26/13 06:48	
Copper, Dissolved	mg/L	ND	0.00050	09/26/13 06:48	
Lead, Dissolved	mg/L	ND	0.00010	09/26/13 06:48	
Zinc, Dissolved	mg/L	0.0011J	0.0050	09/26/13 06:48	

LABORATORY CONTROL SAMPLE: 1529489

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.079	99	85-115	
Cadmium, Dissolved	mg/L	.08	0.082	102	85-115	
Copper, Dissolved	mg/L	.08	0.079	99	85-115	
Lead, Dissolved	mg/L	.08	0.082	103	85-115	
Zinc, Dissolved	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529490 1529491

Parameter	Units	10242377041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.015	.08	.08	0.096	0.095	102	100	70-130	2	20	
Cadmium, Dissolved	mg/L	0.00053	.08	.08	0.083	0.081	103	101	70-130	2	20	
Copper, Dissolved	mg/L	0.044	.08	.08	0.12	0.12	101	99	70-130	1	20	
Lead, Dissolved	mg/L	0.0012	.08	.08	0.083	0.083	102	102	70-130	.2	20	
Zinc, Dissolved	mg/L	0.023	.08	.08	0.11	0.11	106	104	70-130	2	20	

MATRIX SPIKE SAMPLE: 1529492

Parameter	Units	10242377051 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.011	.08	0.090	99	70-130	
Cadmium, Dissolved	mg/L	0.00064	.08	0.080	100	70-130	
Copper, Dissolved	mg/L	0.053	.08	0.13	96	70-130	
Lead, Dissolved	mg/L	0.0052	.08	0.087	102	70-130	
Zinc, Dissolved	mg/L	0.097	.08	0.18	102	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: MPRP/41987 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

METHOD BLANK: 1529493 — Matrix: Water
Associated Lab Samples: 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	09/30/13 13:13	
Cadmium, Dissolved	mg/L	ND	0.000080	09/30/13 13:13	
Copper, Dissolved	mg/L	ND	0.00050	09/30/13 13:13	
Lead, Dissolved	mg/L	ND	0.00010	09/30/13 13:13	
Zinc, Dissolved	mg/L	ND	0.0050	09/30/13 13:13	

LABORATORY CONTROL SAMPLE: 1529494

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.078	98	85-115	
Cadmium, Dissolved	mg/L	.08	0.080	100	85-115	
Copper, Dissolved	mg/L	.08	0.083	103	85-115	
Lead, Dissolved	mg/L	.08	0.080	100	85-115	
Zinc, Dissolved	mg/L	.08	0.084	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1529495 — 1529496

Parameter	Units	10242377061 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.012	.08	.08	0.089	0.092	97	101	70-130	3	20	
Cadmium, Dissolved	mg/L	0.00026	.08	.08	0.078	0.081	97	101	70-130	4	20	
Copper, Dissolved	mg/L	0.049	.08	.08	0.13	0.13	100	106	70-130	4	20	
Lead, Dissolved	mg/L	0.0015	.08	.08	0.076	0.077	93	94	70-130	1	20	
Zinc, Dissolved	mg/L	0.028	.08	.08	0.11	0.11	102	105	70-130	2	20	

MATRIX SPIKE SAMPLE: 1529497

Parameter	Units	10242377071 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0050	.08	0.084	99	70-130	
Cadmium, Dissolved	mg/L	0.00035	.08	0.078	98	70-130	
Copper, Dissolved	mg/L	0.067	.08	0.15	100	70-130	
Lead, Dissolved	mg/L	0.0027	.08	0.076	92	70-130	
Zinc, Dissolved	mg/L	0.35	.08	0.43	96	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/33876 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10242377019, 10242377031, 10242377032

METHOD BLANK: 1604009 Matrix: Water
Associated Lab Samples: 10242377019, 10242377031, 10242377032

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/32368 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016

METHOD BLANK: 1529620 — Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 11:02	

METHOD BLANK: 1529624 — Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 11:03	

LABORATORY CONTROL SAMPLE: 1529621

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	87.4	87	80-120	

SAMPLE DUPLICATE: 1529622

Parameter	Units	10242263001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	61.7	62.3	1	10	

SAMPLE DUPLICATE: 1529623

Parameter	Units	10242377016 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	404	433	7	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/32369 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10242377017, 10242377018, 10242377019, 10242377020, 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026

METHOD BLANK: 1529629 Matrix: Water
Associated Lab Samples: 10242377017, 10242377018, 10242377019, 10242377020, 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 12:33	

METHOD BLANK: 1529633 Matrix: Water
Associated Lab Samples: 10242377017, 10242377018, 10242377019, 10242377020, 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 12:34	

LABORATORY CONTROL SAMPLE: 1529630

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	93.0	93	80-120	

SAMPLE DUPLICATE: 1529631

Parameter	Units	10242377017 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	1270	1370	8	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/32393 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10242377037, 10242377038, 10242377039, 10242377040, 10242377041, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058

METHOD BLANK: 1530375 — Matrix: Water
Associated Lab Samples: 10242377037, 10242377038, 10242377039, 10242377040, 10242377041, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 16:44	

METHOD BLANK: 1530379 — Matrix: Water
Associated Lab Samples: 10242377037, 10242377038, 10242377039, 10242377040, 10242377041, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 16:44	

LABORATORY CONTROL SAMPLE: 1530376

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	110	110	80-120	

SAMPLE DUPLICATE: 1530377

Parameter	Units	10242377037 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	97.5	107	9	10	

SAMPLE DUPLICATE: 1530378

Parameter	Units	10242377058 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	306	333	8	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/32394 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

METHOD BLANK: 1530384 Matrix: Water
Associated Lab Samples: 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 16:38	

METHOD BLANK: 1530388 Matrix: Water
Associated Lab Samples: 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/20/13 16:39	

LABORATORY CONTROL SAMPLE: 1530385

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	82.2	82	80-120	

SAMPLE DUPLICATE: 1530387

Parameter	Units	10242470003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	10.0 U	6.1J		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/32550 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377059, 10242377060, 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068

METHOD BLANK: 1537607 — Matrix: Water
Associated Lab Samples: 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377059, 10242377060, 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 08:09	

METHOD BLANK: 1537611 — Matrix: Water
Associated Lab Samples: 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377059, 10242377060, 10242377061, 10242377062, 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 08:09	

LABORATORY CONTROL SAMPLE: 1537608

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	85.4	85	80-120	

SAMPLE DUPLICATE: 1537609

Parameter	Units	10242377034 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	66.3	67.9	2	10	H1

SAMPLE DUPLICATE: 1537610

Parameter	Units	10242377062 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	62.0	57.0	8	10	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WET/33775 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 10242377019, 10242377031, 10242377032

LABORATORY CONTROL SAMPLE: 1600108

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	100	98-102	H6

SAMPLE DUPLICATE: 1600109

Parameter	Units	10242377019 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.1	7.1	1	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/17057 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10242377019, 10242377031, 10242377032

METHOD BLANK: 1604003 | Matrix: Water
Associated Lab Samples: 10242377019, 10242377031, 10242377032

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/16163 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

METHOD BLANK: 1536432 — Matrix: Water
Associated Lab Samples: 10242377001, 10242377002, 10242377003, 10242377004, 10242377005, 10242377006, 10242377007, 10242377008, 10242377009, 10242377010, 10242377011, 10242377012, 10242377013, 10242377014, 10242377015, 10242377016, 10242377017, 10242377018, 10242377019, 10242377020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/27/13 09:50	

LABORATORY CONTROL SAMPLE: 1536433

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.9	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536434 — 1536435

Parameter	Units	10242377001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.5	20	20	28.6	28.6	90	90	80-120	.05	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536436 — 1536437

Parameter	Units	10242377011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.6	20	20	29.9	30.4	96	99	80-120	2	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/16164 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

METHOD BLANK: 1536439 — Matrix: Water
Associated Lab Samples: 10242377021, 10242377022, 10242377023, 10242377024, 10242377025, 10242377026, 10242377027, 10242377028, 10242377029, 10242377030, 10242377031, 10242377032, 10242377033, 10242377034, 10242377035, 10242377036, 10242377037, 10242377038, 10242377039, 10242377040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/27/13 10:19	

LABORATORY CONTROL SAMPLE: 1536440

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.6	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536441 — 1536442

Parameter	Units	10242377021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	14.8	20	20	32.1	34.6	87	99	80-120	7	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536443 — 1536444

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	8.0	20	20	28.2	27.2	101	96	80-120	4	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/16165 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10242377041, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060, 10242377061, 10242377062

METHOD BLANK: 1536445 — Matrix: Water
Associated Lab Samples: 10242377041, 10242377043, 10242377044, 10242377045, 10242377046, 10242377047, 10242377048, 10242377049, 10242377050, 10242377051, 10242377053, 10242377054, 10242377055, 10242377056, 10242377057, 10242377058, 10242377059, 10242377060, 10242377061, 10242377062

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/27/13 11:19	

LABORATORY CONTROL SAMPLE: 1536446

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.4	85	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536447 — 1536448

Parameter	Units	10242377041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	23.7	20	20	39.7	39.5	80	79	80-120	.5	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536449 — 1536450

Parameter	Units	10242377053 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.9	20	20	27.1	25.4	81	73	80-120	6	30	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/16169 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

METHOD BLANK: 1536562 — Matrix: Water
Associated Lab Samples: 10242377063, 10242377064, 10242377065, 10242377066, 10242377067, 10242377068, 10242377069, 10242377070, 10242377071, 10242377072, 10242377073

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/27/13 13:11	

LABORATORY CONTROL SAMPLE: 1536563

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.2	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536564 — 1536565

Parameter	Units	10242377063 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	12.8	20	20	30.8	30.8	90	90	80-120	.1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536566 — 1536567

Parameter	Units	10242377073 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	21.3	20	20	39.7	37.4	92	81	80-120	6	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/17041 | Analysis Method: SM 4500-Cl E
QC Batch Method: SM 4500-Cl E | Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10242377019, 10242377031, 10242377032

METHOD BLANK: 1603873 | Matrix: Water
Associated Lab Samples: 10242377019, 10242377031, 10242377032

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

QC Batch: WETA/17023 — Analysis Method: SM 4500-NO2 B
QC Batch Method: SM 4500-NO2 B — Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10242377019, 10242377031, 10242377032

METHOD BLANK: 1603178 — Matrix: Water
Associated Lab Samples: 10242377019, 10242377031, 10242377032

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 — 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 — 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
ES	The reported result is estimated because one or more of the constituent results are qualified as such.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377001	**SD0759-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377002	**SD0760-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377003	**SD0761-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377004	**SD0762-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377005	**SD0763-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377006	**SD0764-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377007	**SD0765-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377008	**SD0766-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377009	**SD0767-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377010	**SD0768-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377011	**SD0769-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377012	**SD0770-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377013	**SD0771-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377014	**SD0772-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377015	**SD0773-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377016	**SD0774-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377017	**SD0775-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377018	**SD0776-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377019	**SD0777-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377020	**SD0778-091313**	EPA 200.8	MPRP/41949	EPA 200.8	ICPM/17724
10242377021	**SD0779-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377022	**SD0780-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377023	**SD0781-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377024	**SD0782-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377025	**SD0783-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377026	**SD0784-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377027	**SD0785-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377028	**SD0786-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377029	**SD0787-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377030	**SD0788-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377031	**SD0789-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377032	**SD0790-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377033	**SD0791-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377034	**SD0792-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377035	**SD0793-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377036	**SD0794-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377037	**SD0795-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377038	**SD0796-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377039	**SD0797-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377040	**SD0798-091313**	EPA 200.8	MPRP/41977	EPA 200.8	ICPM/17756
10242377041	**SD0799-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377042	**SD0800-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377043	**SD0801-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377044	**SD0802-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377045	**SD0803-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377046	**SD0804-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377047	**SD0805-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377048	**SD0806-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377049	**SD0807-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377050	**SD0808-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377051	**SD0809-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377052	**SD0810-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377053	**SD0811-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377054	**SD0812-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377055	**SD0813-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377056	**SD0814-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377057	**SD0815-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377058	**SD0816-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377059	**SD0817-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377060	**SD0818-091313**	EPA 200.8	MPRP/41988	EPA 200.8	ICPM/17729
10242377061	**SD0819-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377062	**SD0820-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377063	**SD0821-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377064	**SD0822-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377065	**SD0823-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377066	**SD0824-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377067	**SD0825-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377068	**SD0826-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377069	**SD0827-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377070	**SD0828-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377071	**SD0829-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377072	**SD0830-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377073	**SD0831-091313**	EPA 200.8	MPRP/41989	EPA 200.8	ICPM/17757
10242377001	**SD0759-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377002	**SD0760-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377003	**SD0761-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377004	**SD0762-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377005	**SD0763-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377006	**SD0764-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377007	**SD0765-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377008	**SD0766-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377009	**SD0767-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377010	**SD0768-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377011	**SD0769-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377012	**SD0770-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377013	**SD0771-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377014	**SD0772-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377015	**SD0773-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377016	**SD0774-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377017	**SD0775-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377018	**SD0776-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377019	**SD0777-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377020	**SD0778-091313**	EPA 200.8	MPRP/41944	EPA 200.8	ICPM/17727
10242377021	**SD0779-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377022	**SD0780-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377023	**SD0781-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377024	**SD0782-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377025	**SD0783-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377026	**SD0784-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377027	**SD0785-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377028	**SD0786-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377029	**SD0787-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377030	**SD0788-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377031	**SD0789-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377032	**SD0790-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377033	**SD0791-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377034	**SD0792-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377035	**SD0793-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377036	**SD0794-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377037	**SD0795-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377038	**SD0796-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377039	**SD0797-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377040	**SD0798-091313**	EPA 200.8	MPRP/41976	EPA 200.8	ICPM/17759
10242377041	**SD0799-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377042	**SD0800-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377043	**SD0801-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377044	**SD0802-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377045	**SD0803-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377046	**SD0804-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377047	**SD0805-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377048	**SD0806-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377049	**SD0807-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377050	**SD0808-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377051	**SD0809-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377053	**SD0811-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377054	**SD0812-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377055	**SD0813-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377056	**SD0814-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377057	**SD0815-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377058	**SD0816-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377059	**SD0817-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377060	**SD0818-091313**	EPA 200.8	MPRP/41986	EPA 200.8	ICPM/17730
10242377061	**SD0819-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377062	**SD0820-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377063	**SD0821-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377064	**SD0822-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377065	**SD0823-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377066	**SD0824-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377067	**SD0825-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377068	**SD0826-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377069	**SD0827-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377070	**SD0828-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377071	**SD0829-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770

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Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377072	**SD0830-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377073	**SD0831-091313**	EPA 200.8	MPRP/41987	EPA 200.8	ICPM/17770
10242377001	**SD0759-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377002	**SD0760-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377003	**SD0761-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377004	**SD0762-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377005	**SD0763-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377006	**SD0764-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377007	**SD0765-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377008	**SD0766-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377009	**SD0767-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377010	**SD0768-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377011	**SD0769-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377012	**SD0770-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377013	**SD0771-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377014	**SD0772-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377015	**SD0773-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377016	**SD0774-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377017	**SD0775-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377018	**SD0776-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377019	**SD0777-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377020	**SD0778-091313**	EPA 245.1	MERP/9347	EPA 245.1	MERC/10650
10242377021	**SD0779-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377022	**SD0780-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377023	**SD0781-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377024	**SD0782-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377025	**SD0783-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377026	**SD0784-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377027	**SD0785-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377028	**SD0786-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377029	**SD0787-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377030	**SD0788-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377031	**SD0789-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377032	**SD0790-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377033	**SD0791-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377034	**SD0792-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377035	**SD0793-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377036	**SD0794-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377037	**SD0795-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377038	**SD0796-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377039	**SD0797-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377040	**SD0798-091313**	EPA 245.1	MERP/9280	EPA 245.1	MERC/10625
10242377041	**SD0799-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377042	**SD0800-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377043	**SD0801-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377044	**SD0802-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377045	**SD0803-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377046	**SD0804-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377047	**SD0805-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377048	**SD0806-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377049	**SD0807-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377050	**SD0808-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377051	**SD0809-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377052	**SD0810-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377053	**SD0811-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377054	**SD0812-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377055	**SD0813-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377056	**SD0814-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377057	**SD0815-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377058	**SD0816-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377059	**SD0817-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377060	**SD0818-091313**	EPA 245.1	MERP/9281	EPA 245.1	MERC/10664
10242377061	**SD0819-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377062	**SD0820-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377063	**SD0821-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377064	**SD0822-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377065	**SD0823-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377066	**SD0824-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377067	**SD0825-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377068	**SD0826-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377069	**SD0827-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377070	**SD0828-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377071	**SD0829-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377072	**SD0830-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377073	**SD0831-091313**	EPA 245.1	MERP/9282	EPA 245.1	MERC/10641
10242377001	**SD0759-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377002	**SD0760-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377003	**SD0761-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377004	**SD0762-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377005	**SD0763-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377006	**SD0764-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377007	**SD0765-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377008	**SD0766-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377009	**SD0767-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377010	**SD0768-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377011	**SD0769-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377012	**SD0770-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377013	**SD0771-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377014	**SD0772-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377015	**SD0773-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377016	**SD0774-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377017	**SD0775-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377018	**SD0776-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377019	**SD0777-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649
10242377020	**SD0778-091313**	EPA 245.1	MERP/9348	EPA 245.1	MERC/10649

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377021	**SD0779-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377022	**SD0780-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377023	**SD0781-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377024	**SD0782-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377025	**SD0783-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377026	**SD0784-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377027	**SD0785-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377028	**SD0786-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377029	**SD0787-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377030	**SD0788-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377031	**SD0789-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377032	**SD0790-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377033	**SD0791-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377034	**SD0792-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377035	**SD0793-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377036	**SD0794-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377037	**SD0795-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377038	**SD0796-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377039	**SD0797-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377040	**SD0798-091313**	EPA 245.1	MERP/9276	EPA 245.1	MERC/10626
10242377041	**SD0799-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377042	**SD0800-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377043	**SD0801-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377044	**SD0802-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377045	**SD0803-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377046	**SD0804-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377047	**SD0805-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377048	**SD0806-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377049	**SD0807-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377050	**SD0808-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377051	**SD0809-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377053	**SD0811-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377054	**SD0812-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377055	**SD0813-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377056	**SD0814-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377057	**SD0815-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377058	**SD0816-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377059	**SD0817-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377060	**SD0818-091313**	EPA 245.1	MERP/9277	EPA 245.1	MERC/10665
10242377061	**SD0819-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377062	**SD0820-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377063	**SD0821-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377064	**SD0822-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377065	**SD0823-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377066	**SD0824-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377067	**SD0825-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377068	**SD0826-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377069	**SD0827-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377070	**SD0828-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377071	**SD0829-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377072	**SD0830-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377073	**SD0831-091313**	EPA 245.1	MERP/9278	EPA 245.1	MERC/10647
10242377019	**SD0777-091313**	SM 2320B	WET/33876		
10242377031	**SD0789-091313**	SM 2320B	WET/33876		
10242377032	**SD0790-091313**	SM 2320B	WET/33876		
10242377001	**SD0759-091313**	SM 2540D	WET/32368		
10242377002	**SD0760-091313**	SM 2540D	WET/32368		
10242377003	**SD0761-091313**	SM 2540D	WET/32368		
10242377004	**SD0762-091313**	SM 2540D	WET/32368		
10242377005	**SD0763-091313**	SM 2540D	WET/32368		
10242377006	**SD0764-091313**	SM 2540D	WET/32368		
10242377007	**SD0765-091313**	SM 2540D	WET/32368		
10242377008	**SD0766-091313**	SM 2540D	WET/32368		
10242377009	**SD0767-091313**	SM 2540D	WET/32368		
10242377010	**SD0768-091313**	SM 2540D	WET/32368		
10242377011	**SD0769-091313**	SM 2540D	WET/32368		
10242377012	**SD0770-091313**	SM 2540D	WET/32368		
10242377013	**SD0771-091313**	SM 2540D	WET/32368		
10242377014	**SD0772-091313**	SM 2540D	WET/32368		
10242377015	**SD0773-091313**	SM 2540D	WET/32368		
10242377016	**SD0774-091313**	SM 2540D	WET/32368		
10242377017	**SD0775-091313**	SM 2540D	WET/32369		
10242377018	**SD0776-091313**	SM 2540D	WET/32369		
10242377019	**SD0777-091313**	SM 2540D	WET/32369		
10242377020	**SD0778-091313**	SM 2540D	WET/32369		
10242377021	**SD0779-091313**	SM 2540D	WET/32369		
10242377022	**SD0780-091313**	SM 2540D	WET/32369		
10242377023	**SD0781-091313**	SM 2540D	WET/32369		
10242377024	**SD0782-091313**	SM 2540D	WET/32369		
10242377025	**SD0783-091313**	SM 2540D	WET/32369		
10242377026	**SD0784-091313**	SM 2540D	WET/32369		
10242377027	**SD0785-091313**	SM 2540D	WET/32550		
10242377028	**SD0786-091313**	SM 2540D	WET/32550		
10242377029	**SD0787-091313**	SM 2540D	WET/32550		
10242377030	**SD0788-091313**	SM 2540D	WET/32550		
10242377031	**SD0789-091313**	SM 2540D	WET/32550		
10242377032	**SD0790-091313**	SM 2540D	WET/32550		
10242377033	**SD0791-091313**	SM 2540D	WET/32550		
10242377034	**SD0792-091313**	SM 2540D	WET/32550		
10242377035	**SD0793-091313**	SM 2540D	WET/32550		
10242377036	**SD0794-091313**	SM 2540D	WET/32550		
10242377037	**SD0795-091313**	SM 2540D	WET/32393		
10242377038	**SD0796-091313**	SM 2540D	WET/32393		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377039	**SD0797-091313**	SM 2540D	WET/32393		
10242377040	**SD0798-091313**	SM 2540D	WET/32393		
10242377041	**SD0799-091313**	SM 2540D	WET/32393		
10242377043	**SD0801-091313**	SM 2540D	WET/32393		
10242377044	**SD0802-091313**	SM 2540D	WET/32393		
10242377045	**SD0803-091313**	SM 2540D	WET/32393		
10242377046	**SD0804-091313**	SM 2540D	WET/32393		
10242377047	**SD0805-091313**	SM 2540D	WET/32393		
10242377048	**SD0806-091313**	SM 2540D	WET/32393		
10242377049	**SD0807-091313**	SM 2540D	WET/32393		
10242377050	**SD0808-091313**	SM 2540D	WET/32393		
10242377051	**SD0809-091313**	SM 2540D	WET/32393		
10242377053	**SD0811-091313**	SM 2540D	WET/32393		
10242377054	**SD0812-091313**	SM 2540D	WET/32393		
10242377055	**SD0813-091313**	SM 2540D	WET/32393		
10242377056	**SD0814-091313**	SM 2540D	WET/32393		
10242377057	**SD0815-091313**	SM 2540D	WET/32393		
10242377058	**SD0816-091313**	SM 2540D	WET/32393		
10242377059	**SD0817-091313**	SM 2540D	WET/32550		
10242377060	**SD0818-091313**	SM 2540D	WET/32550		
10242377061	**SD0819-091313**	SM 2540D	WET/32550		
10242377062	**SD0820-091313**	SM 2540D	WET/32550		
10242377063	**SD0821-091313**	SM 2540D	WET/32550		
10242377064	**SD0822-091313**	SM 2540D	WET/32550		
10242377065	**SD0823-091313**	SM 2540D	WET/32550		
10242377066	**SD0824-091313**	SM 2540D	WET/32550		
10242377067	**SD0825-091313**	SM 2540D	WET/32550		
10242377068	**SD0826-091313**	SM 2540D	WET/32550		
10242377069	**SD0827-091313**	SM 2540D	WET/32394		
10242377070	**SD0828-091313**	SM 2540D	WET/32394		
10242377071	**SD0829-091313**	SM 2540D	WET/32394		
10242377072	**SD0830-091313**	SM 2540D	WET/32394		
10242377073	**SD0831-091313**	SM 2540D	WET/32394		
10242377019	**SD0777-091313**	SM 4500-H+B	WET/33775		
10242377031	**SD0789-091313**	SM 4500-H+B	WET/33775		
10242377032	**SD0790-091313**	SM 4500-H+B	WET/33775		
10242377019	**SD0777-091313**	SM 4500-NO3 H	WETA/17057		
10242377031	**SD0789-091313**	SM 4500-NO3 H	WETA/17057		
10242377032	**SD0790-091313**	SM 4500-NO3 H	WETA/17057		
10242377001	**SD0759-091313**	ASTM D516	WETA/16163		
10242377002	**SD0760-091313**	ASTM D516	WETA/16163		
10242377003	**SD0761-091313**	ASTM D516	WETA/16163		
10242377004	**SD0762-091313**	ASTM D516	WETA/16163		
10242377005	**SD0763-091313**	ASTM D516	WETA/16163		
10242377006	**SD0764-091313**	ASTM D516	WETA/16163		
10242377007	**SD0765-091313**	ASTM D516	WETA/16163		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377008	**SD0766-091313**	ASTM D516	WETA/16163		
10242377009	**SD0767-091313**	ASTM D516	WETA/16163		
10242377010	**SD0768-091313**	ASTM D516	WETA/16163		
10242377011	**SD0769-091313**	ASTM D516	WETA/16163		
10242377012	**SD0770-091313**	ASTM D516	WETA/16163		
10242377013	**SD0771-091313**	ASTM D516	WETA/16163		
10242377014	**SD0772-091313**	ASTM D516	WETA/16163		
10242377015	**SD0773-091313**	ASTM D516	WETA/16163		
10242377016	**SD0774-091313**	ASTM D516	WETA/16163		
10242377017	**SD0775-091313**	ASTM D516	WETA/16163		
10242377018	**SD0776-091313**	ASTM D516	WETA/16163		
10242377019	**SD0777-091313**	ASTM D516	WETA/16163		
10242377020	**SD0778-091313**	ASTM D516	WETA/16163		
10242377021	**SD0779-091313**	ASTM D516	WETA/16164		
10242377022	**SD0780-091313**	ASTM D516	WETA/16164		
10242377023	**SD0781-091313**	ASTM D516	WETA/16164		
10242377024	**SD0782-091313**	ASTM D516	WETA/16164		
10242377025	**SD0783-091313**	ASTM D516	WETA/16164		
10242377026	**SD0784-091313**	ASTM D516	WETA/16164		
10242377027	**SD0785-091313**	ASTM D516	WETA/16164		
10242377028	**SD0786-091313**	ASTM D516	WETA/16164		
10242377029	**SD0787-091313**	ASTM D516	WETA/16164		
10242377030	**SD0788-091313**	ASTM D516	WETA/16164		
10242377031	**SD0789-091313**	ASTM D516	WETA/16164		
10242377032	**SD0790-091313**	ASTM D516	WETA/16164		
10242377033	**SD0791-091313**	ASTM D516	WETA/16164		
10242377034	**SD0792-091313**	ASTM D516	WETA/16164		
10242377035	**SD0793-091313**	ASTM D516	WETA/16164		
10242377036	**SD0794-091313**	ASTM D516	WETA/16164		
10242377037	**SD0795-091313**	ASTM D516	WETA/16164		
10242377038	**SD0796-091313**	ASTM D516	WETA/16164		
10242377039	**SD0797-091313**	ASTM D516	WETA/16164		
10242377040	**SD0798-091313**	ASTM D516	WETA/16164		
10242377041	**SD0799-091313**	ASTM D516	WETA/16165		
10242377043	**SD0801-091313**	ASTM D516	WETA/16165		
10242377044	**SD0802-091313**	ASTM D516	WETA/16165		
10242377045	**SD0803-091313**	ASTM D516	WETA/16165		
10242377046	**SD0804-091313**	ASTM D516	WETA/16165		
10242377047	**SD0805-091313**	ASTM D516	WETA/16165		
10242377048	**SD0806-091313**	ASTM D516	WETA/16165		
10242377049	**SD0807-091313**	ASTM D516	WETA/16165		
10242377050	**SD0808-091313**	ASTM D516	WETA/16165		
10242377051	**SD0809-091313**	ASTM D516	WETA/16165		
10242377053	**SD0811-091313**	ASTM D516	WETA/16165		
10242377054	**SD0812-091313**	ASTM D516	WETA/16165		
10242377055	**SD0813-091313**	ASTM D516	WETA/16165		
10242377056	**SD0814-091313**	ASTM D516	WETA/16165		
10242377057	**SD0815-091313**	ASTM D516	WETA/16165		

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic
Pace Project No.: 10242377

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242377058	**SD0816-091313**	ASTM D516	WETA/16165		
10242377059	**SD0817-091313**	ASTM D516	WETA/16165		
10242377060	**SD0818-091313**	ASTM D516	WETA/16165		
10242377061	**SD0819-091313**	ASTM D516	WETA/16165		
10242377062	**SD0820-091313**	ASTM D516	WETA/16165		
10242377063	**SD0821-091313**	ASTM D516	WETA/16169		
10242377064	**SD0822-091313**	ASTM D516	WETA/16169		
10242377065	**SD0823-091313**	ASTM D516	WETA/16169		
10242377066	**SD0824-091313**	ASTM D516	WETA/16169		
10242377067	**SD0825-091313**	ASTM D516	WETA/16169		
10242377068	**SD0826-091313**	ASTM D516	WETA/16169		
10242377069	**SD0827-091313**	ASTM D516	WETA/16169		
10242377070	**SD0828-091313**	ASTM D516	WETA/16169		
10242377071	**SD0829-091313**	ASTM D516	WETA/16169		
10242377072	**SD0830-091313**	ASTM D516	WETA/16169		
10242377073	**SD0831-091313**	ASTM D516	WETA/16169		
10242377019	**SD0777-091313**	SM 4500-Cl E	WETA/17041		
10242377031	**SD0789-091313**	SM 4500-Cl E	WETA/17041		
10242377032	**SD0790-091313**	SM 4500-Cl E	WETA/17041		
10242377019	**SD0777-091313**	SM 4500-NO2 B	WETA/17023		
10242377031	**SD0789-091313**	SM 4500-NO2 B	WETA/17023		
10242377032	**SD0790-091313**	SM 4500-NO2 B	WETA/17023		

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R11

BP Remediation Management COC - Effective Dates: August 23, 2011- June 30, 2012

BP LaMP COC Rev. 7, Aug 23, 2011

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10242377

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision OOC-BU OOC-RM	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson

BP PM Phone: 723-1838

BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4	Comments
	SD0759-091313	9/16/2013	9:26		x			3	1		2			x	x	x	10242377001
	SD0760-091313	9/16/2013	9:33		x			3	1		2			x	x	x	002
	SD0761-091313	9/16/2013	9:36		x			3	1		2			x	x	x	003
	SD0762-091313	9/16/2013	9:41		x			3	1		2			x	x	x	004
	SD0763-091313	9/16/2013	9:46		x			3	1		2			x	x	x	005
	SD0764-091313	9/16/2013	9:50		x			3	1		2			x	x	x	006
	SD0765-091313	9/16/2013	9:53		x			3	1		2			x	x	x	007
	SD0766-091313	9/16/2013	9:59		x			3	1		2			x	x	x	008
	SD0767-091313	9/16/2013	10:05		x			3	1		2			x	x	x	009
	SD0768-091313	9/16/2013	10:09		x			3	1		2			x	x	x	010

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Paddy Stoy								
Sampler's Company:	TREC INC			TREC	9-17-13	1035	PACE	9-18-13	09:00
Shipment Method:	Fed Ex	Ship Date:	9/17/2013						
Shipment Tracking No:	8006 6032 3530								

Special Instructions:

~~8052~~ CB 9-18-13

8116 18549052 : 5.6°C 8637 2097 5184 : 1.2°C = See Attached

8006 6032 3530 : 0.7°C " " 5125 : 2.9°C

8037 2097 5136 : 1.1°C 8476 2749 5828 : 3.6°C

" " 5897 : 6.0°C

Page 1 of 1

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy):
Rush TAT: Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10242377

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0769-091313	9/16/2013	10:12		x			3	1		2				x	x	x								10242377011
	SD0770-091313	9/16/2013	10:16		x			3	1		2				x	x	x								012
	SD0771-091313	9/16/2013	10:19		x			3	1		2				x	x	x								013
	SD0772-091313	9/16/2013	10:23		x			3	1		2				x	x	x								014
	SD0773-091313	9/16/2013	10:28		x			3	1		2				x	x	x								015
	SD0774-091313	9/16/2013	10:34		x			3	1		2				x	x	x								016
	SD0775-091313	9/16/2013	10:37		x			3	1		2				x	x	x								017
	SD0776-091313	9/16/2013	10:41		x			3	1		2				x	x	x								018
	SD0777-091313	9/16/2013	10:45		x			3	1		2				x	x	x								019
	SD0778-091313	9/16/2013	11:04		x			3	1		2				x	x	x								020

Sampler's Name:	Paddy Stoy	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	Pay Stoy / TREC	9-17-13	1035	(illegible) PACE	9-18-13	0900
Shipment Method:	Fed Ex Ship Date: 9/17/2013						
Shipment Tracking No:	8006 6032 3530						

Special Instructions:

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10242377

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4							Comments
	SD0789-091313	9/16/2013	11:55		x			3	1		2				x	x	x							10242377031
	SD0790-091313	9/16/2013	11:58		x			3	1		2				x	x	x							032
	SD0791-091313	9/16/2013	12:00		x			3	1		2				x	x	x							033
	SD0792-091313	9/16/2013	12:06		x			3	1		2				x	x	x							034
	SD0793-091313	9/16/2013	12:09		x			3	1		2				x	x	x							035
	SD0794-091313	9/16/2013	12:13		x			3	1		2				x	x	x							036
	SD0795-091313	9/16/2013	12:16		x			3	1		2				x	x	x							037
	SD0796-091313	9/16/2013	12:19		x			3	1		2				x	x	x							038
	SD0797-091313	9/16/2013	12:23		x			3	1		2				x	x	x							039
	SD0798-091313	9/16/2013	12:57		x			3	1		2				x	x	x							040

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Paddy Stoy								
Sampler's Company:	TREC INC			[illegible] Stoy TREC	9-17-13	1035	[illegible] PACE	9-18-13	0900
Shipment Method:	Fed Ex	Ship Date:	9/17/2013						
Shipment Tracking No:	8006 6032 3530								

Special Instructions:

BP Remediation Management COC - Effective Dates: August 23, 2011- June 30, 2012

BP LaMP COC Rev. 7, Aug 23, 2011

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy): Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number:

5 of 8

10242377

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0799-091313	9/16/2013	13:01		x			3	1		2				x	x	x								10242377041
	SD0800-091313	9/16/2013	13:06		x			2			2				x	x									042
	SD0801-091313	9/16/2013	13:09		x			3	1		2				x	x	x								043
	SD0802-091313	9/16/2013	13:13		x			3	1		2				x	x	x								044
	SD0803-091313	9/16/2013	13:18		x			3	1		2				x	x	x								045
	SD0804-091313	9/16/2013	13:23		x			3	1		2				x	x	x								046
	SD0805-091313	9/16/2013	13:26		x			3	1		2				x	x	x								047
	SD0806-091313	9/16/2013	13:28		x			3	1		2				x	x	x								048
	SD0807-091313	9/16/2013	13:33		x			3	1		2				x	x	x								049
	SD0808-091313	9/16/2013	13:36		x			3	1		2				x	x	x								050

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Paddy Stoy			Paddy Stoy / TREC	9-17-13	1035	PACE	9-18-13	0900
Sampler's Company:	TREC INC								
Shipment Method:	Fed Ex	Ship Date:	9/17/2013						
Shipment Tracking No:	8006 6032 3530								

Special Instructions:

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10242377

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision OOC-BU OOC-RM	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level

Standard ____

Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4	Comments
	SD0809-091313	9/16/2013	13:39		x			3	1		2			x	x	x	10242377 051 ~~052~~ 359-1813
	SD0810-091313	9/16/2013	13:42		x			1			1			x			052
	SD0811-091313	9/16/2013	13:47		x			3	1		2			x	x	x	053
	SD0812-091313	9/16/2013	13:50		x			3	1		2			x	x	x	054
	SD0813-091313	9/16/2013	13:53		x			3	1		2			x	x	x	055
	SD0814-091313	9/16/2013	13:57		x			3	1		2			x	x	x	056
	SD0815-091313	9/16/2013	14:00		x			3	1		2			x	x	x	057
	SD0816-091313	9/16/2013	14:04		x			3	1		2			x	x	x	058
	SD0817-091313	9/16/2013	14:07		x			3	1		2			x	x	x	059
	SD0818-091313	9/16/2013	14:10		x			3	1		2			x	x	x	060

Sampler's Name:	Paddy Stoy		
Sampler's Company:	TREC INC		
Shipment Method:	Fed Ex	Ship Date:	9/17/2013
Shipment Tracking No:	8006 6032 3530		

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Paddy Stoy / TREC	9-17-13	1035	PACE	9-18-13	0900

Special Instructions:

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10242377

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4							Comments
	SD0819-091313	9/16/2013	14:19		x			3	1		2				x	x	x							10242377061
	SD0820-091313	9/16/2013	14:22		x			3	1		2				x	x	x							062
	SD0821-091313	9/16/2013	14:26		x			3	1		2				x	x	x							063
	SD0822-091313	9/16/2013	14:30		x			3	1		2				x	x	x							064
	SD0823-091313	9/16/2013	14:34		x			3	1		2				x	x	x							065
	SD0824-091313	9/16/2013	14:37		x			3	1		2				x	x	x							066
	SD0825-091313	9/16/2013	14:42		x			3	1		2				x	x	x							067
	SD0826-091313	9/16/2013	14:46		x			3	1		2				x	x	x							068
	SD0827-091313	9/16/2013	14:49		x			3	1		2				x	x	x							069
	SD0828-091313	9/16/2013	14:51		x			3	1		2				x	x	x							070

Sampler's Name:	Paddy Stoy	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	Paddy Stoy TREC	9-17-13	1035	PACE	9-18-13	0900
Shipment Method:	Fed Ex Ship Date: 9/17/2013						
Shipment Tracking No:	8006 6032 3530						

Special Instructions:

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10242377

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4	Comments
	SD0829-091313	9/16/2013	14:55		x			3	1		2			x	x	x	10242377071
	SD0830-091313	9/16/2013	14:58		x			3	1		2			x	x	x	072
	SD0831-091313	9/16/2013	15:02		x			3	1		2			x	x	x	073

Sampler's Name:	Paddy Stoy	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	Stoy STS / TREC	9-17-13	1035	PACE	9-18-13	0900
Shipment Method:	Fed Ex Ship Date: 9/17/2013						
Shipment Tracking No:	8006 6032 3530						

Special Instructions:

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10242377

10242377

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: See SEF

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): See SEF **Cooler Temp Corrected (°C):** See SEF **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +.5 **Date and Initials of Person Examining Contents:** CB 9-18-13

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☐ No	☒ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☐ No	☒ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-73 2/2
Per method, VOA pH is checked after analysis				Initial when completed: CB Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 12:00	Temp: See SEF	Corrected Temp: +.5
Time: 12:20	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 9/18/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical	Document Name: **SCUR Exceptions Form**	Document Revised: 16Apr2012 Page 1 of 1
	Document No.: **F-MN-L-220-Rev.00**	Issuing Authority: Pace Minnesota Quality Office

Workorder #: 10242377

Issue (Tracking #)	Sample ID (Temp)	Container Type/#
8716 1054 9052	5.6	
8006 6032 3530	0.7	
8637 7097 5136	1.1	
" " 5114	1.2	
" " 5125	2.9	
8476 2749 5828	3.6	
" " 5817	6.0	
" " 5839	1.3	

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 15, 2014

Craig Deeney
BPAR-TREC-MT
1800 W. Koch
Suite 6
Bozeman, MT 59715

RE: Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Dear Craig Deeney:
Enclosed are the analytical results for sample(s) received by the laboratory between September 24, 2013 and September 25, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 11/19/13 to update the analytical results for the total metals for SD0842-091713. The incorrect data was originally uploaded and the error has been fixed.

This report was revised on 1/15/14 to add metals, Cl, Alkalinity, NO3 & pH per the clients request. Samples effected: 018 & 034.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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cc: Jill Bedessem, BPAR-TREC-MT

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CERTIFICATIONS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10243059001	**SD0832-091713**	Water	09/20/13 11:54	09/24/13 09:03
10243059002	**SD0833-091713**	Water	09/20/13 11:57	09/24/13 09:03
10243059003	**SD0834-091713**	Water	09/20/13 12:02	09/24/13 09:03
10243059004	**SD0835-091713**	Water	09/20/13 12:07	09/24/13 09:03
10243059005	**SD0836-091713**	Water	09/20/13 12:13	09/24/13 09:03
10243059006	**SD0837-091713**	Water	09/20/13 12:20	09/24/13 09:03
10243059007	**SD0838-091713**	Water	09/20/13 12:32	09/24/13 09:03
10243059008	**SD0839-091713**	Water	09/20/13 12:40	09/24/13 09:03
10243059009	**SD0840-091713**	Water	09/20/13 12:42	09/24/13 09:03
10243059010	**SD0841-091713**	Water	09/20/13 12:50	09/24/13 09:03
10243059011	**SD0842-091713**	Water	09/20/13 12:59	09/24/13 09:03
10243059012	**SD0843-091713**	Water	09/20/13 13:07	09/24/13 09:03
10243059013	**SD0844-091713**	Water	09/20/13 13:14	09/24/13 09:03
10243059014	**SD0845-091713**	Water	09/20/13 13:16	09/24/13 09:03
10243059015	**SD0846-091713**	Water	09/20/13 13:27	09/24/13 09:03
10243059016	**SD0847-091713**	Water	09/20/13 13:31	09/24/13 09:03
10243059017	**SD0848-091713**	Water	09/20/13 13:38	09/24/13 09:03
10243059018	**SD0849-091713**	Water	09/20/13 13:42	09/24/13 09:03
10243059019	**SD0850-091713**	Water	09/20/13 13:58	09/24/13 09:03
10243059020	**SD0851-091713**	Water	09/20/13 14:03	09/24/13 09:03
10243059021	**SD0852-091713**	Water	09/20/13 14:15	09/24/13 09:03
10243059022	**SD0853-091713**	Water	09/20/13 14:18	09/24/13 09:03
10243059023	**SD0854-091713**	Water	09/20/13 14:24	09/24/13 09:03
10243059024	**SD0855-091713**	Water	09/20/13 14:31	09/24/13 09:03
10243059025	**SD0856-091713**	Water	09/20/13 14:40	09/24/13 09:03
10243059026	**SD0857-091713**	Water	09/20/13 14:46	09/24/13 09:03
10243059027	**SD0858-091713**	Water	09/20/13 14:49	09/24/13 09:03
10243059028	**SD0859-091713**	Water	09/20/13 14:55	09/24/13 09:03
10243059029	**SD0860-091713**	Water	09/20/13 15:00	09/24/13 09:03
10243059030	**SD0861-091713**	Water	09/20/13 15:12	09/24/13 09:03
10243059031	**SD0862-091713**	Water	09/20/13 15:15	09/24/13 09:03
10243059032	**SD0863-091713**	Water	09/20/13 15:19	09/24/13 09:03
10243059033	**SD0864-091713**	Water	09/20/13 15:22	09/24/13 09:03
10243059034	**SD0865-091713**	Water	09/20/13 15:29	09/24/13 09:03
10243059035	**SD0866-091713**	Water	09/20/13 15:52	09/24/13 09:03
10243059036	**SD0867-091713**	Water	09/20/13 15:57	09/24/13 09:03
10243059037	**SD0868-091713**	Water	09/20/13 16:01	09/24/13 09:03

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10243059038	**SD0869-091713**	Water	09/20/13 16:08	09/24/13 09:03
10243059039	**SD0870-091713**	Water	09/20/13 16:15	09/24/13 09:03
10243059040	**SD0871-091713**	Water	09/20/13 16:21	09/24/13 09:03
10243059041	**SD0872-091713**	Water	09/20/13 16:28	09/24/13 09:03
10243059042	**SD0873-091713**	Water	09/20/13 16:39	09/24/13 09:03
10243059043	**SD0874-091713**	Water	09/20/13 16:51	09/24/13 09:03
10243059044	**SD0875-091713**	Water	09/20/13 16:55	09/24/13 09:03
10243059045	**SD0876-091713**	Water	09/20/13 17:00	09/24/13 09:03
10243059046	**SD0877-091713**	Water	09/20/13 17:07	09/24/13 09:03
10243059047	**SD0878-091713**	Water	09/20/13 17:09	09/24/13 09:03
10243059048	**SD0879-091713**	Water	09/20/13 17:11	09/24/13 09:03
10243059049	**SD0880-091713**	Water	09/23/13 09:36	09/24/13 09:03
10243059050	**SD0881-091713**	Water	09/23/13 09:43	09/24/13 09:03
10243059051	**SD0882-091713**	Water	09/23/13 09:47	09/24/13 09:03
10243059052	**SD0883-091713**	Water	09/23/13 09:50	09/24/13 09:03
10243059053	**SD0884-091713**	Water	09/23/13 09:58	09/24/13 09:03
10243059054	**SD0885-091713**	Water	09/23/13 10:00	09/24/13 09:03
10243059055	**SD0886-091713**	Water	09/23/13 10:04	09/24/13 09:03
10243059056	**SD0887-091713**	Water	09/23/13 10:06	09/24/13 09:03
10243059057	**SD0888-091713**	Water	09/23/13 10:10	09/24/13 09:03
10243059058	**SD0889-091713**	Water	09/23/13 10:14	09/24/13 09:03
10243059059	**SD0890-091713**	Water	09/23/13 10:18	09/24/13 09:03
10243059060	**SD0891-091713**	Water	09/23/13 10:24	09/24/13 09:03
10243059061	**SD0892-091713**	Water	09/23/13 10:39	09/24/13 09:03
10243059062	**SD0893-091713**	Water	09/23/13 10:42	09/24/13 09:03
10243059063	**SD0894-091713**	Water	09/23/13 10:46	09/24/13 09:03
10243059064	**SD0895-091713**	Water	09/23/13 10:49	09/24/13 09:03
10243059065	**SD0896-091713**	Water	09/23/13 10:54	09/24/13 09:03
10243059066	**SD0897-091713**	Water	09/23/13 10:58	09/24/13 09:03
10243059067	**SD0898-091713**	Water	09/23/13 11:01	09/24/13 09:03
10243059068	**SD0899-091713**	Water	09/23/13 11:04	09/24/13 09:03
10243059069	**SD0900-091713**	Water	09/23/13 11:07	09/24/13 09:03
10243059070	**SD0901-091713**	Water	09/23/13 11:11	09/24/13 09:03
10243059071	**SD0902-091813**	Water	09/23/13 11:28	09/24/13 09:03
10243059072	**SD0903-091813**	Water	09/23/13 11:30	09/24/13 09:03
10243059073	**SD0904-091813**	Water	09/23/13 11:35	09/24/13 09:03
10243059074	**SD0905-091813**	Water	09/23/13 11:38	09/24/13 09:03

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SAMPLE SUMMARY

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10243059075	**SD0906-091813**	Water	09/23/13 11:44	09/24/13 09:03
10243059076	**SD0907-091813**	Water	09/23/13 11:48	09/24/13 09:03
10243059077	**SD0908-091813**	Water	09/23/13 11:51	09/24/13 09:03
10243059078	**SD0909-091813**	Water	09/23/13 11:54	09/24/13 09:03
10243059079	**SD0910-091813**	Water	09/23/13 12:03	09/24/13 09:03
10243059080	**SD0911-091813**	Water	09/23/13 12:07	09/24/13 09:03
10243059081	**SD0912-091813**	Water	09/23/13 12:10	09/24/13 09:03
10243059082	**SD0925-091813**	Water	09/23/13 13:02	09/24/13 09:03
10243059083	**SD0926-091813**	Water	09/23/13 13:05	09/24/13 09:03
10243059084	**SD0927-091813**	Water	09/23/13 13:08	09/24/13 09:03
10243059085	**SD0928-091813**	Water	09/23/13 13:11	09/24/13 09:03
10243059086	**SD0929-091813**	Water	09/23/13 13:14	09/24/13 09:03
10243059087	**SD0930-091813**	Water	09/23/13 13:18	09/24/13 09:03
10243059088	**SD0931-091813**	Water	09/23/13 13:21	09/24/13 09:03
10243059089	**SD0932-091813**	Water	09/23/13 13:24	09/24/13 09:03
10243059090	**SD0933-091813**	Water	09/23/13 13:26	09/24/13 09:03
10243059091	**SD0924-091813**	Water	09/23/13 12:57	09/24/13 09:03
10243059092	**SD0913-091813**	Water	09/23/13 12:13	09/25/13 09:20
10243059093	**SD0914-091813**	Water	09/23/13 12:15	09/25/13 09:20
10243059094	**SD0915-091813**	Water	09/23/13 12:24	09/25/13 09:20
10243059095	**SD0916-091813**	Water	09/23/13 12:30	09/25/13 09:20
10243059096	**SD0917-091813**	Water	09/23/13 12:34	09/25/13 09:20
10243059097	**SD0918-091813**	Water	09/23/13 12:36	09/25/13 09:20
10243059098	**SD0919-091813**	Water	09/23/13 12:42	09/25/13 09:20
10243059099	**SD0920-091813**	Water	09/23/13 12:46	09/25/13 09:20
10243059100	**SD0921-091813**	Water	09/23/13 12:49	09/25/13 09:20
10243059101	**SD0922-091813**	Water	09/23/13 12:51	09/25/13 09:20
10243059102	**SD0923-091813**	Water	09/23/13 12:55	09/25/13 09:20

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10243059001	**SD0832-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059002	**SD0833-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059003	**SD0834-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059004	**SD0835-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059005	**SD0836-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059006	**SD0837-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059007	**SD0838-091713**	EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059008	**SD0839-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059009	**SD0840-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059010	**SD0841-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059011	**SD0842-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059012	**SD0843-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059013	**SD0844-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059014	**SD0845-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059015	**SD0846-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059016	**SD0847-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059017	**SD0848-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059018	**SD0849-091713**	EPA 200.8	AJM	12
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	HNKH	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10243059019	**SD0850-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059020	**SD0851-091713**	EPA 200.8	AJM	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059021	**SD0852-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059022	**SD0853-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059023	**SD0854-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059024	**SD0855-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059025	**SD0856-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059026	**SD0857-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059027	**SD0858-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059028	**SD0859-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059029	**SD0860-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059030	**SD0861-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059031	**SD0862-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059032	**SD0863-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059033	**SD0864-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059034	**SD0865-091713**	EPA 200.8	RB1	12
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2320B	MWD	1
		SM 2540D	HNKH	1
		SM 4500-H+B	HNKH	1
		SM 4500-NO3 H	MWD	2
		ASTM D516	KEO	1
		SM 4500-Cl E	KEO	1
		SM 4500-NO2 B	KEO	1
10243059035	**SD0866-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059036	**SD0867-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10243059037	**SD0868-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059038	**SD0869-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059039	**SD0870-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059040	**SD0871-091713**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059041	**SD0872-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059042	**SD0873-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059043	**SD0874-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
10243059044	**SD0875-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059045	**SD0876-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059046	**SD0877-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059047	**SD0878-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059048	**SD0879-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059049	**SD0880-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10243059050	**SD0881-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059051	**SD0882-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059052	**SD0883-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059053	**SD0884-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059054	**SD0885-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059055	**SD0886-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059056	**SD0887-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059057	**SD0888-091713**	EPA 200.8	TT3	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059058	**SD0889-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059059	**SD0890-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059060	**SD0891-091713**	EPA 200.8	TT3	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059061	**SD0892-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059062	**SD0893-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059063	**SD0894-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059064	**SD0895-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059065	**SD0896-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059066	**SD0897-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059067	**SD0898-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059068	**SD0899-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059069	**SD0900-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059070	**SD0901-091713**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		ASTM D516	KEO	1
10243059071	**SD0902-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059072	**SD0903-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059073	**SD0904-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059074	**SD0905-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059075	**SD0906-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059076	**SD0907-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059077	**SD0908-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059078	**SD0909-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059079	**SD0910-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059080	**SD0911-091813**	EPA 200.8	AJM	5
		EPA 200.8	RB1	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059081	**SD0912-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059082	**SD0925-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059083	**SD0926-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059084	**SD0927-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059085	**SD0928-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059086	**SD0929-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059087	**SD0930-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059088	**SD0931-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059089	**SD0932-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059090	**SD0933-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059091	**SD0924-091813**	EPA 200.8	RB1	5
		EPA 200.8	AJM	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059092	**SD0913-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059093	**SD0914-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
10243059094	**SD0915-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059095	**SD0916-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059096	**SD0917-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1

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SAMPLE ANALYTE COUNT

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059097	**SD0918-091813**	EPA 200.8	AJM	5
		EPA 245.1	WBS	1
10243059098	**SD0919-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059099	**SD0920-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059100	**SD0921-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059101	**SD0922-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1
10243059102	**SD0923-091813**	EPA 200.8	AJM	5
		EPA 200.8	TT3	5
		EPA 245.1	WBS	1
		EPA 245.1	WBS	1
		SM 2540D	HNKH	1
		ASTM D516	KEO	1

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
102 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/42143

B: Analyte was detected in the associated method blank.

- BLANK for HBN 269932 [MPRP/421 (Lab ID: 1535098)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/42143

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059081,10243059091

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1535102)
  - Arsenic

QC Batch: MPRP/42138

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059004,10243059011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1535074)
  - Arsenic
  - Cadmium

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-TREC-MT
Date: January 15, 2014

QC Batch: MPRP/42138

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059004,10243059011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Copper
- Lead
- Zinc

- MS (Lab ID: 1544653)
  - Lead
  - Zinc
- MSD (Lab ID: 1544654)
  - Lead
  - Zinc

QC Batch: MPRP/42142

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059065,10243059072

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1545036)
  - Zinc
- MSD (Lab ID: 1545037)
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/42143

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1535100)
  - Zinc
- MSD (Lab ID: 1535101)
  - Zinc

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
101 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/42133

B: Analyte was detected in the associated method blank.

- BLANK for HBN 269922 [MPRP/421 (Lab ID: 1535044)
  - Copper, Dissolved

QC Batch: MPRP/42134

B: Analyte was detected in the associated method blank.

- BLANK for HBN 269923 [MPRP/421 (Lab ID: 1535049)
  - Zinc, Dissolved

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/42136

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059061,10243059071

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1535063)
  - Zinc, Dissolved

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **EPA 200.8**
Description: 200.8 MET ICPMS, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

QC Batch: MPRP/42133

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059004,10243059011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1535048)
  - Zinc, Dissolved

Additional Comments:

Analyte Comments:

QC Batch: MPRP/42136

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1535063)
  - Zinc, Dissolved

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
102 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **EPA 245.1**
Description: 245.1 Mercury, Dissolved
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
101 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9332

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243059022,10243059040

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1533084)
  - Mercury, Dissolved

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0849-091713 (Lab ID: 10243059018)
- SD0865-091713 (Lab ID: 10243059034)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
87 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.

- SD0856-091713 (Lab ID: 10243059025)
- SD0857-091713 (Lab ID: 10243059026)
- SD0858-091713 (Lab ID: 10243059027)
- SD0859-091713 (Lab ID: 10243059028)
- SD0860-091713 (Lab ID: 10243059029)
- SD0861-091713 (Lab ID: 10243059030)
- SD0862-091713 (Lab ID: 10243059031)
- SD0863-091713 (Lab ID: 10243059032)
- SD0864-091713 (Lab ID: 10243059033)
- SD0865-091713 (Lab ID: 10243059034)
- SD0866-091713 (Lab ID: 10243059035)
- SD0867-091713 (Lab ID: 10243059036)
- SD0868-091713 (Lab ID: 10243059037)
- SD0871-091713 (Lab ID: 10243059040)
- SD0872-091713 (Lab ID: 10243059041)
- SD0873-091713 (Lab ID: 10243059042)
- SD0874-091713 (Lab ID: 10243059043)
- SD0875-091713 (Lab ID: 10243059044)
- SD0876-091713 (Lab ID: 10243059045)
- SD0877-091713 (Lab ID: 10243059046)
- SD0878-091713 (Lab ID: 10243059047)
- SD0879-091713 (Lab ID: 10243059048)
- SD0899-091713 (Lab ID: 10243059068)
- SD0900-091713 (Lab ID: 10243059069)
- SD0901-091713 (Lab ID: 10243059070)
- SD0902-091813 (Lab ID: 10243059071)
- SD0903-091813 (Lab ID: 10243059072)
- SD0904-091813 (Lab ID: 10243059073)
- SD0905-091813 (Lab ID: 10243059074)
- SD0906-091813 (Lab ID: 10243059075)
- SD0908-091813 (Lab ID: 10243059077)
- SD0909-091813 (Lab ID: 10243059078)
- SD0910-091813 (Lab ID: 10243059079)
- SD0911-091813 (Lab ID: 10243059080)
- SD0912-091813 (Lab ID: 10243059081)
- SD0915-091813 (Lab ID: 10243059094)
- SD0916-091813 (Lab ID: 10243059095)
- SD0917-091813 (Lab ID: 10243059096)
- SD0919-091813 (Lab ID: 10243059098)

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-TREC-MT
Date: January 15, 2014

H1: Analysis conducted outside the recognized method holding time.

- SD0920-091813 (Lab ID: 10243059099)
- SD0921-091813 (Lab ID: 10243059100)
- SD0922-091813 (Lab ID: 10243059101)
- SD0923-091813 (Lab ID: 10243059102)
- SD0924-091813 (Lab ID: 10243059091)
- SD0925-091813 (Lab ID: 10243059082)
- SD0926-091813 (Lab ID: 10243059083)
- SD0927-091813 (Lab ID: 10243059084)
- SD0928-091813 (Lab ID: 10243059085)
- SD0929-091813 (Lab ID: 10243059086)
- SD0930-091813 (Lab ID: 10243059087)
- SD0931-091813 (Lab ID: 10243059088)
- SD0932-091813 (Lab ID: 10243059089)
- SD0933-091813 (Lab ID: 10243059090)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/32583

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1539936)
  - Total Suspended Solids

QC Batch: WET/32584

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1539949)
  - Total Suspended Solids

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- SD0849-091713 (Lab ID: 10243059018)
- SD0865-091713 (Lab ID: 10243059034)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- SD0849-091713 (Lab ID: 10243059018)
- SD0865-091713 (Lab ID: 10243059034)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
87 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16228

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242536051,10243059094

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1542187)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0849-091713 (Lab ID: 10243059018)
- SD0865-091713 (Lab ID: 10243059034)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Method: **SM 4500-NO2 B**
Description: SM4500NO2-B, Nitrite, unpres
Client: BPAR-TREC-MT
Date: January 15, 2014

General Information:
2 samples were analyzed for SM 4500-NO2 B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- SD0849-091713 (Lab ID: 10243059018)
- SD0865-091713 (Lab ID: 10243059034)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17023

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242377019,10253697001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1603180)
  - Nitrite as N
- MSD (Lab ID: 1603181)
  - Nitrite as N

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0832-091713 **Lab ID: 10243059001** Collected: 09/20/13 11:54 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 18:32	7440-38-2	
Cadmium	**0.0033**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 18:32	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 18:32	7440-50-8	
Lead	**0.30**	mg/L	0.00050	0.00023	5	10/04/13 17:13	10/08/13 18:34	7439-92-1	
Zinc	**1.0**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/08/13 18:34	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0026**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 20:50	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 20:50	7440-43-9	
Copper, Dissolved	**0.015**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 20:50	7440-50-8	
Lead, Dissolved	**0.0023**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 20:50	7439-92-1	
Zinc, Dissolved	**0.080**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 20:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00040**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:32	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**225**	mg/L	10.0	5.0	1		09/27/13 09:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.2**	mg/L	2.5	1.2	1		09/27/13 12:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0833-091713 **Lab ID: 10243059002** Collected: 09/20/13 11:57 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 18:37	7440-38-2	
Cadmium	**0.0040**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 18:37	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 18:37	7440-50-8	
Lead	**0.36**	mg/L	0.00050	0.00023	5	10/04/13 17:13	10/08/13 18:40	7439-92-1	
Zinc	**1.4**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/08/13 18:40	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0036**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 20:53	7440-38-2	
Cadmium, Dissolved	**0.0011**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 20:53	7440-43-9	
Copper, Dissolved	**0.020**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 20:53	7440-50-8	
Lead, Dissolved	**0.0084**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 20:53	7439-92-1	
Zinc, Dissolved	**0.24**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 20:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00062**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**247**	mg/L	10.0	5.0	1		09/27/13 09:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		09/27/13 12:56	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0834-091713 **Lab ID: 10243059003** Collected: 09/20/13 12:02 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 18:42	7440-38-2	
Cadmium	**0.0063**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 18:42	7440-43-9	
Copper	**0.16**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 18:42	7440-50-8	
Lead	**0.47**	mg/L	0.00050	0.00023	5	10/04/13 17:13	10/08/13 18:45	7439-92-1	
Zinc	**1.6**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/08/13 18:45	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0038**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 20:56	7440-38-2	
Cadmium, Dissolved	**0.0014**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 20:56	7440-43-9	
Copper, Dissolved	**0.022**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 20:56	7440-50-8	
Lead, Dissolved	**0.0086**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 20:56	7439-92-1	
Zinc, Dissolved	**0.35**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 20:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00088**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:40	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:44	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**279**	mg/L	20.0	10.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.5**	mg/L	2.5	1.2	1		09/27/13 12:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0835-091713 **Lab ID: 10243059004** Collected: 09/20/13 12:07 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 18:48	7440-38-2	
Cadmium	**0.0057**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 18:48	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 18:48	7440-50-8	
Lead	**0.55**	mg/L	0.00050	0.00023	5	10/04/13 17:13	10/08/13 18:50	7439-92-1	M1
Zinc	**1.8**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/08/13 18:50	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0033**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 20:58	7440-38-2	
Cadmium, Dissolved	**0.0011**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 20:58	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 20:58	7440-50-8	
Lead, Dissolved	**0.0065**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 20:58	7439-92-1	
Zinc, Dissolved	**0.27**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 20:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00074**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:43	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:46	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**281**	mg/L	10.0	5.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**14.3**	mg/L	2.5	1.2	1		09/27/13 12:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0836-091713 **Lab ID: 10243059005** Collected: 09/20/13 12:13 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0098**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:07	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:07	7440-43-9	
Copper	**0.076**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 19:07	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 19:07	7439-92-1	
Zinc	**0.50**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/08/13 19:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0031**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:10	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:10	7440-43-9	
Copper, Dissolved	**0.015**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 21:10	7440-50-8	
Lead, Dissolved	**0.0027**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:10	7439-92-1	
Zinc, Dissolved	**0.045**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 21:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:45	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:48	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**141**	mg/L	10.0	5.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**2.7**	mg/L	2.5	1.2	1		09/27/13 12:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0837-091713 **Lab ID: 10243059006** Collected: 09/20/13 12:20 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0099**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:12	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:12	7440-43-9	
Copper	**0.080**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 19:12	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 19:12	7439-92-1	
Zinc	**0.57**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/08/13 19:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0028**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:21	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:21	7440-43-9	
Copper, Dissolved	**0.016**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 21:21	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:21	7439-92-1	
Zinc, Dissolved	**0.068**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 21:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00027**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:51	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**180**	mg/L	10.0	5.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.2**	mg/L	2.5	1.2	1		09/27/13 12:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0838-091713 **Lab ID: 10243059007** Collected: 09/20/13 12:32 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.16**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:18	7440-38-2	
Cadmium	**0.082**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:18	7440-43-9	
Copper	**2.2**	mg/L	0.050	0.017	100	10/04/13 17:13	10/08/13 19:20	7440-50-8	
Lead	**1.5**	mg/L	0.010	0.0046	100	10/04/13 17:13	10/08/13 19:20	7439-92-1	
Zinc	**28.4**	mg/L	0.50	0.098	100	10/04/13 17:13	10/08/13 19:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0025**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:23	7440-38-2	
Cadmium, Dissolved	**0.066**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:23	7440-43-9	
Copper, Dissolved	**0.18**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 21:23	7440-50-8	
Lead, Dissolved	**0.00058**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:23	7439-92-1	
Zinc, Dissolved	**23.6**	mg/L	0.50	0.098	100	10/04/13 17:09	10/09/13 17:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00098**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:50	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:53	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**497**	mg/L	20.0	10.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**330**	mg/L	62.5	31.2	25		09/27/13 13:09	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0839-091713 **Lab ID: 10243059008** Collected: 09/20/13 12:40 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.088**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:23	7440-38-2	
Cadmium	**0.067**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:23	7440-43-9	
Copper	**1.4**	mg/L	0.025	0.0087	50	10/04/13 17:13	10/08/13 19:26	7440-50-8	
Lead	**1.2**	mg/L	0.0050	0.0023	50	10/04/13 17:13	10/08/13 19:26	7439-92-1	
Zinc	**26.5**	mg/L	0.50	0.098	100	10/04/13 17:13	10/09/13 17:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0020**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:29	7440-38-2	
Cadmium, Dissolved	**0.064**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:29	7440-43-9	
Copper, Dissolved	**0.25**	mg/L	0.0025	0.00087	5	10/04/13 17:09	10/08/13 21:32	7440-50-8	
Lead, Dissolved	**0.00098**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:29	7439-92-1	
Zinc, Dissolved	**24.3**	mg/L	0.50	0.098	100	10/04/13 17:09	10/09/13 17:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00075**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:55	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**443**	mg/L	20.0	10.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**226**	mg/L	25.0	12.5	10		09/27/13 13:02	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0840-091713 **Lab ID: 10243059009** Collected: 09/20/13 12:42 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.096**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:37	7440-38-2	
Cadmium	**0.074**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:37	7440-43-9	
Copper	**1.5**	mg/L	0.025	0.0087	50	10/04/13 17:13	10/08/13 19:39	7440-50-8	
Lead	**1.3**	mg/L	0.0050	0.0023	50	10/04/13 17:13	10/08/13 19:39	7439-92-1	
Zinc	**26.2**	mg/L	0.50	0.098	100	10/04/13 17:13	10/09/13 17:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0019**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:34	7440-38-2	
Cadmium, Dissolved	**0.062**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:34	7440-43-9	
Copper, Dissolved	**0.24**	mg/L	0.0025	0.00087	5	10/04/13 17:09	10/08/13 21:37	7440-50-8	
Lead, Dissolved	**0.00088**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:34	7439-92-1	
Zinc, Dissolved	**22.4**	mg/L	0.50	0.098	100	10/04/13 17:09	10/09/13 17:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00079**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 10:55	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 16:57	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**207**	mg/L	10.0	5.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**225**	mg/L	25.0	12.5	10		09/27/13 13:04	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0841-091713 **Lab ID: 10243059010** Collected: 09/20/13 12:50 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/11/13 15:29	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/11/13 15:29	7440-43-9	
Copper	**0.00056**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/11/13 15:29	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/11/13 15:29	7439-92-1	
Zinc	ND	mg/L	0.0050	0.00098	1	10/04/13 17:13	10/11/13 15:29	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:40	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:40	7440-43-9	
Copper, Dissolved	**0.00065**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 21:40	7440-50-8	B
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:40	7439-92-1	
Zinc, Dissolved	**0.0013J**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 21:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:03	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/27/13 09:28		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		10/01/13 11:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0842-091713 **Lab ID: 10243059011** Collected: 09/20/13 12:59 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.069**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:45	7440-38-2	M1
Cadmium	**0.041**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:45	7440-43-9	M1
Copper	**0.89**	mg/L	0.025	0.0087	50	10/04/13 17:13	10/08/13 19:48	7440-50-8	M1
Lead	**0.87**	mg/L	0.0050	0.0023	50	10/04/13 17:13	10/08/13 19:48	7439-92-1	M1
Zinc	**14.0**	mg/L	0.25	0.049	50	10/04/13 17:13	10/08/13 19:48	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0026**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:43	7440-38-2	
Cadmium, Dissolved	**0.033**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:43	7440-43-9	
Copper, Dissolved	**0.093**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 21:43	7440-50-8	
Lead, Dissolved	**0.00072**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:43	7439-92-1	
Zinc, Dissolved	**11.2**	mg/L	0.25	0.049	50	10/04/13 17:09	10/09/13 18:07	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00067**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:05	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:05	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**300**	mg/L	14.3	7.1	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**212**	mg/L	25.0	12.5	10		10/01/13 11:54	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0843-091713 **Lab ID: 10243059012** Collected: 09/20/13 13:07 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:53	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:53	7440-43-9	
Copper	**0.054**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 19:53	7440-50-8	
Lead	**0.027**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 19:53	7439-92-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	10/04/13 17:13	10/08/13 19:53	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 21:59	7440-38-2	
Cadmium, Dissolved	**0.00053**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 21:59	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 21:59	7440-50-8	
Lead, Dissolved	**0.00059**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 21:59	7439-92-1	
Zinc, Dissolved	**0.13**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 21:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:07	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**31.9**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**26.9**	mg/L	5.0	2.5	2		10/01/13 11:46	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0844-091713 **Lab ID: 10243059013** Collected: 09/20/13 13:14 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.028**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 19:56	7440-38-2	
Cadmium	**0.0047**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 19:56	7440-43-9	
Copper	**0.43**	mg/L	0.0050	0.0017	10	10/04/13 17:13	10/08/13 19:58	7440-50-8	
Lead	**0.11**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 19:56	7439-92-1	
Zinc	**2.6**	mg/L	0.050	0.0098	10	10/04/13 17:13	10/08/13 19:58	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0029**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:02	7440-38-2	
Cadmium, Dissolved	**0.0017**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:02	7440-43-9	
Copper, Dissolved	**0.090**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:02	7440-50-8	
Lead, Dissolved	**0.00030**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:02	7439-92-1	
Zinc, Dissolved	**1.4**	mg/L	0.025	0.0049	5	10/04/13 17:09	10/08/13 22:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:10	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:09	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0845-091713 **Lab ID: 10243059014** Collected: 09/20/13 13:16 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.062**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:09	7440-38-2	
Cadmium	**0.010**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:09	7440-43-9	
Copper	**1.2**	mg/L	0.0050	0.0017	10	10/04/13 17:13	10/08/13 20:12	7440-50-8	
Lead	**0.19**	mg/L	0.0010	0.00046	10	10/04/13 17:13	10/08/13 20:12	7439-92-1	
Zinc	**5.2**	mg/L	0.10	0.020	20	10/04/13 17:13	10/09/13 15:22	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0028**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:07	7440-38-2	
Cadmium, Dissolved	**0.0031**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:07	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:07	7440-50-8	
Lead, Dissolved	**0.000064J**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:07	7439-92-1	
Zinc, Dissolved	**1.6**	mg/L	0.025	0.0049	5	10/04/13 17:09	10/08/13 22:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00017J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:12	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:11	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0846-091713 **Lab ID: 10243059015** Collected: 09/20/13 13:27 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:15	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:15	7440-43-9	
Copper	**0.092**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 20:15	7440-50-8	
Lead	**0.088**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 20:15	7439-92-1	
Zinc	**0.41**	mg/L	0.0050	0.00098	1	10/04/13 17:13	10/08/13 20:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0041**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:21	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:21	7440-43-9	
Copper, Dissolved	**0.020**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:21	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:21	7439-92-1	
Zinc, Dissolved	**0.085**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 22:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000093J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:15	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**112**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.2**	mg/L	2.5	1.2	1		10/01/13 11:32	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0847-091713 **Lab ID: 10243059016** Collected: 09/20/13 13:31 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:17	7440-38-2	
Cadmium	**0.00099**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:17	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 20:17	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 20:17	7439-92-1	
Zinc	**0.40**	mg/L	0.0050	0.00098	1	10/04/13 17:13	10/08/13 20:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0036**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:24	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:24	7440-43-9	
Copper, Dissolved	**0.029**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:24	7440-50-8	
Lead, Dissolved	**0.0026**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:24	7439-92-1	
Zinc, Dissolved	**0.076**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 22:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:17	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**104**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.1**	mg/L	2.5	1.2	1		10/01/13 11:35	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0848-091713 **Lab ID: 10243059017** Collected: 09/20/13 13:38 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:20	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:20	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 20:20	7440-50-8	
Lead	**0.11**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 20:20	7439-92-1	
Zinc	**0.43**	mg/L	0.0050	0.00098	1	10/04/13 17:13	10/08/13 20:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0047**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:27	7440-38-2	
Cadmium, Dissolved	**0.00029**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:27	7440-43-9	
Copper, Dissolved	**0.034**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:27	7440-50-8	
Lead, Dissolved	**0.0032**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:27	7439-92-1	
Zinc, Dissolved	**0.099**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 22:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00037**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:25	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:22	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**121**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**11.7**	mg/L	2.5	1.2	1		10/01/13 11:35	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0849-091713 **Lab ID: 10243059018** Collected: 09/20/13 13:42 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:23	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:23	7440-43-9	
Calcium	**35.5**	mg/L	0.10	0.049	5	10/04/13 17:13	10/09/13 17:44	7440-70-2	
Copper	**0.13**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 20:23	7440-50-8	
Iron	**6.5**	mg/L	0.25	0.030	5	10/04/13 17:13	10/09/13 17:44	7439-89-6	
Lead	**0.11**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 20:23	7439-92-1	
Magnesium	**7.1**	mg/L	0.025	0.012	5	10/04/13 17:13	10/09/13 17:44	7439-95-4	
Manganese	**0.47**	mg/L	0.0025	0.00092	5	10/04/13 17:13	10/09/13 17:44	7439-96-5	
Potassium	**5.1**	mg/L	0.10	0.024	5	10/04/13 17:13	10/09/13 17:44	7440-09-7	
Silica	**32.4**	mg/L	0.27	0.13	5	10/04/13 17:13	10/09/13 17:44	7631-86-9	
Sodium	**10.2**	mg/L	0.25	0.051	5	10/04/13 17:13	10/09/13 17:44	7440-23-5	
Zinc	**0.45**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/09/13 17:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0053**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:30	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:30	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:30	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:30	7439-92-1	
Zinc, Dissolved	**0.051**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 22:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00016J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:27	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00010J**	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:24	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**57.5**	mg/L	5.0	2.5	1		01/03/14 13:35		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**191**	mg/L	10.0	5.0	1		09/27/13 09:29		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.4**	Std. Units	0.10	0.050	1		01/03/14 09:59		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**2.2**	mg/L	0.10	0.050	1		01/03/14 12:29	14797-55-8	H1
Nitrogen, NO2 plus NO3	**2.2**	mg/L	0.10	0.050	1		01/03/14 12:29		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**19.0**	mg/L	2.5	1.2	1		10/01/13 11:35	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**11.8**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0849-091713 **Lab ID: 10243059018** Collected: 09/20/13 13:42 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:53	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0850-091713 **Lab ID: 10243059019** Collected: 09/20/13 13:58 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0096**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:25	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:25	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 20:25	7440-50-8	
Lead	**0.063**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 20:25	7439-92-1	
Zinc	**0.47**	mg/L	0.025	0.0049	5	10/04/13 17:13	10/09/13 17:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0041**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:32	7440-38-2	
Cadmium, Dissolved	**0.00050**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:32	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:32	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:32	7439-92-1	
Zinc, Dissolved	**0.19**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 22:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000077J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:30	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:26	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**63.0**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.4**	mg/L	2.5	1.2	1		10/01/13 11:35	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0851-091713 **Lab ID: 10243059020** Collected: 09/20/13 14:03 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0088**	mg/L	0.00050	0.000093	1	10/04/13 17:13	10/08/13 20:28	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	10/04/13 17:13	10/08/13 20:28	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/04/13 17:13	10/08/13 20:28	7440-50-8	
Lead	**0.060**	mg/L	0.00010	0.000046	1	10/04/13 17:13	10/08/13 20:28	7439-92-1	
Zinc	**0.38**	mg/L	0.0050	0.00098	1	10/04/13 17:13	10/08/13 20:28	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0040**	mg/L	0.00050	0.000093	1	10/04/13 17:09	10/08/13 22:35	7440-38-2	
Cadmium, Dissolved	**0.00044**	mg/L	0.000080	0.000032	1	10/04/13 17:09	10/08/13 22:35	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	10/04/13 17:09	10/08/13 22:35	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	10/04/13 17:09	10/08/13 22:35	7439-92-1	
Zinc, Dissolved	**0.16**	mg/L	0.0050	0.00098	1	10/04/13 17:09	10/08/13 22:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000078J**	mg/L	0.00020	0.000030	1	10/05/13 10:20	10/08/13 11:32	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:29	10/04/13 17:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**59.6**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.5**	mg/L	2.5	1.2	1		10/01/13 11:38	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0852-091713 **Lab ID: 10243059021** Collected: 09/20/13 14:15 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0081**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 14:35	7440-38-2	
Cadmium	**0.00096**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 14:35	7440-43-9	
Copper	**0.097**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 14:35	7440-50-8	
Lead	**0.046**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 14:35	7439-92-1	
Zinc	**0.35**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 14:35	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0043**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 11:44	7440-38-2	
Cadmium, Dissolved	**0.00044**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 11:44	7440-43-9	
Copper, Dissolved	**0.041**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 11:44	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 11:44	7439-92-1	
Zinc, Dissolved	**0.15**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 11:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000079J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 11:49	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 17:42	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**59.9**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.2**	mg/L	2.5	1.2	1		10/01/13 11:38	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0853-091713 **Lab ID: 10243059022** Collected: 09/20/13 14:18 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0092**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 14:39	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 14:39	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 14:39	7440-50-8	
Lead	**0.057**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 14:39	7439-92-1	
Zinc	**0.37**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 14:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0044**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 11:47	7440-38-2	
Cadmium, Dissolved	**0.00038**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 11:47	7440-43-9	
Copper, Dissolved	**0.040**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 11:47	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 11:47	7439-92-1	
Zinc, Dissolved	**0.13**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 11:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000051J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 11:52	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 17:44	7439-97-6	M1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**63.4**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.9**	mg/L	2.5	1.2	1		10/01/13 11:38	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0854-091713 **Lab ID: 10243059023** Collected: 09/20/13 14:24 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 14:44	7440-38-2	
Cadmium	**0.00099**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 14:44	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 14:44	7440-50-8	
Lead	**0.085**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 14:44	7439-92-1	
Zinc	**0.38**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 14:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0044**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 11:50	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 11:50	7440-43-9	
Copper, Dissolved	**0.039**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 11:50	7440-50-8	
Lead, Dissolved	**0.0026**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 11:50	7439-92-1	
Zinc, Dissolved	**0.074**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 11:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000098J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:04	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00017J**	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 17:57	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**110**	mg/L	10.0	5.0	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.7**	mg/L	2.5	1.2	1		10/01/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0855-091713 **Lab ID: 10243059024** Collected: 09/20/13 14:31 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 15:06	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 15:06	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 15:06	7440-50-8	
Lead	**0.15**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 15:06	7439-92-1	
Zinc	**0.63**	mg/L	0.025	0.0049	5	10/09/13 00:00	10/09/13 15:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0067**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:57	7440-38-2	
Cadmium, Dissolved	**0.00033**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:57	7440-43-9	
Copper, Dissolved	**0.043**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:57	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:57	7439-92-1	
Zinc, Dissolved	**0.068**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 17:59	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**213**	mg/L	14.3	7.1	1		09/27/13 09:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		10/01/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0856-091713 **Lab ID: 10243059025** Collected: 09/20/13 14:40 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 15:16	7440-38-2	
Cadmium	**0.00047**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 15:16	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 15:16	7440-50-8	
Lead	**0.029**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 15:16	7439-92-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/09/13 15:16	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 11:53	7440-38-2	
Cadmium, Dissolved	**0.00020**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 11:53	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 11:53	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 11:53	7439-92-1	
Zinc, Dissolved	**0.062**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 11:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000048J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:09	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:01	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**50.9**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.1**	mg/L	2.5	1.2	1		10/01/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0857-091713 **Lab ID: 10243059026** Collected: 09/20/13 14:46 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 15:20	7440-38-2	
Cadmium	**0.00050**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 15:20	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 15:20	7440-50-8	
Lead	**0.029**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 15:20	7439-92-1	
Zinc	**0.18**	mg/L	0.025	0.0049	5	10/09/13 00:00	10/09/13 15:25	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 11:56	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 11:56	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 11:56	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 11:56	7439-92-1	
Zinc, Dissolved	**0.061**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 11:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000043J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:11	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**50.5**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.0**	mg/L	2.5	1.2	1		10/01/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0858-091713 **Lab ID: 10243059027** Collected: 09/20/13 14:49 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 15:46	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 15:46	7440-43-9	
Copper	ND	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 15:46	7440-50-8	
Lead	**0.000075J**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 15:46	7439-92-1	
Zinc	ND	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/09/13 15:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 11:58	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 11:58	7440-43-9	
Copper, Dissolved	**0.00030J**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 11:58	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 11:58	7439-92-1	
Zinc, Dissolved	**0.0019J**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 11:58	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:14	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:05	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		10/01/13 11:40	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0859-091713 **Lab ID: 10243059028** Collected: 09/20/13 14:55 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 15:50	7440-38-2	
Cadmium	**0.00062**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 15:50	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 15:50	7440-50-8	
Lead	**0.043**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 15:50	7439-92-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/09/13 15:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0082**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:01	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:01	7440-43-9	
Copper, Dissolved	**0.038**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:01	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:01	7439-92-1	
Zinc, Dissolved	**0.018**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000056J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:16	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**64.8**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.5**	mg/L	2.5	1.2	1		10/01/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0860-091713 **Lab ID: 10243059029** Collected: 09/20/13 15:00 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 14:49	7440-38-2	
Cadmium	**0.00071**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 14:49	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 14:49	7440-50-8	
Lead	**0.054**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 14:49	7439-92-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 14:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0070**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:04	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:04	7440-43-9	
Copper, Dissolved	**0.034**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:04	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:04	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000043J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:19	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:09	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**110**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.9**	mg/L	2.5	1.2	1		10/01/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0861-091713 **Lab ID: 10243059030** Collected: 09/20/13 15:12 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 14:54	7440-38-2	
Cadmium	**0.00097**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 14:54	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 14:54	7440-50-8	
Lead	**0.090**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 14:54	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 14:54	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0060**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:15	7440-38-2	
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:15	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:15	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:15	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00022**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**123**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.7**	mg/L	2.5	1.2	1		10/01/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0862-091713 **Lab ID: 10243059031** Collected: 09/20/13 15:15 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 14:58	7440-38-2	
Cadmium	**0.00067**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 14:58	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 14:58	7440-50-8	
Lead	**0.050**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 14:58	7439-92-1	
Zinc	**0.22**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 14:58	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0070**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:18	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:18	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:18	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:18	7439-92-1	
Zinc, Dissolved	**0.048**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000093J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:29	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:18	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**78.2**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**13.1**	mg/L	2.5	1.2	1		10/01/13 11:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0863-091713 **Lab ID: 10243059032** Collected: 09/20/13 15:19 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 16:10	7440-38-2	
Cadmium	**0.00039**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 16:10	7440-43-9	
Copper	**0.077**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 16:10	7440-50-8	
Lead	**0.025**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 16:10	7439-92-1	
Zinc	**0.11**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/09/13 16:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:24	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:24	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:24	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:24	7439-92-1	
Zinc, Dissolved	**0.027**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000095J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:31	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:20	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**30.2**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.2**	mg/L	2.5	1.2	1		10/01/13 12:08	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0864-091713 **Lab ID: 10243059033** Collected: 09/20/13 15:22 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 16:14	7440-38-2	
Cadmium	**0.00040**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 16:14	7440-43-9	
Copper	**0.085**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 16:14	7440-50-8	
Lead	**0.030**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 16:14	7439-92-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/09/13 16:14	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0069**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:26	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:26	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:26	7440-50-8	
Lead, Dissolved	**0.0018**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:26	7439-92-1	
Zinc, Dissolved	**0.029**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:22	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**44.3**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.0**	mg/L	2.5	1.2	1		10/01/13 12:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0865-091713 **Lab ID: 10243059034** Collected: 09/20/13 15:29 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0068**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 16:53	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 16:53	7440-43-9	
Calcium	**12.5**	mg/L	0.020	0.0098	1	10/09/13 00:00	10/09/13 16:53	7440-70-2	
Copper	**0.039**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 16:53	7440-50-8	
Iron	**0.083**	mg/L	0.050	0.0059	1	10/09/13 00:00	10/09/13 16:53	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 16:53	7439-92-1	
Magnesium	**3.1**	mg/L	0.0050	0.0024	1	10/09/13 00:00	10/09/13 16:53	7439-95-4	
Manganese	**0.014**	mg/L	0.00050	0.00018	1	10/09/13 00:00	10/09/13 16:53	7439-96-5	
Potassium	**2.8**	mg/L	0.020	0.0047	1	10/09/13 00:00	10/09/13 16:53	7440-09-7	
Silica	**7.6**	mg/L	0.054	0.027	1	10/09/13 00:00	10/09/13 16:53	7631-86-9	
Sodium	**2.9**	mg/L	0.050	0.010	1	10/09/13 00:00	10/09/13 16:53	7440-23-5	
Zinc	**0.037**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/09/13 16:53	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0071**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:29	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:29	7440-43-9	
Copper, Dissolved	**0.036**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:29	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:29	7439-92-1	
Zinc, Dissolved	**0.035**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:24	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**29.5**	mg/L	5.0	2.5	1		01/03/14 13:47		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**53.5**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.7**	Std. Units	0.10	0.050	1		01/03/14 10:00		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrate as N	**1.1**	mg/L	0.10	0.050	1		01/03/14 12:33	14797-55-8	H1
Nitrogen, NO2 plus NO3	**1.1**	mg/L	0.10	0.050	1		01/03/14 12:33		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.7**	mg/L	2.5	1.2	1		10/01/13 12:10	14808-79-8	
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**5.5**	mg/L	2.0	1.0	1		01/02/14 14:21	16887-00-6	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0865-091713 **Lab ID: 10243059034** Collected: 09/20/13 15:29 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B								
Nitrite as N	ND	mg/L	0.10	0.050	1		12/31/13 14:55	14797-65-0	H3

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0866-091713 **Lab ID: 10243059035** Collected: 09/20/13 15:52 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0097**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 16:57	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 16:57	7440-43-9	
Copper	**0.095**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 16:57	7440-50-8	
Lead	**0.086**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 16:57	7439-92-1	
Zinc	**0.54**	mg/L	0.025	0.0049	5	10/09/13 00:00	10/09/13 17:02	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0034**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:40	7440-38-2	
Cadmium, Dissolved	**0.00058**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:40	7440-43-9	
Copper, Dissolved	**0.022**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:40	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:40	7439-92-1	
Zinc, Dissolved	**0.21**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000080J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:38	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:26	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**86.0**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.0**	mg/L	2.5	1.2	1		10/01/13 12:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0867-091713 **Lab ID: 10243059036** Collected: 09/20/13 15:57 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0085**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 17:07	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 17:07	7440-43-9	
Copper	**0.088**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 17:07	7440-50-8	
Lead	**0.078**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 17:07	7439-92-1	
Zinc	**0.46**	mg/L	0.025	0.0049	5	10/09/13 00:00	10/09/13 17:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0030**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:43	7440-38-2	
Cadmium, Dissolved	**0.00058**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:43	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:43	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:43	7439-92-1	
Zinc, Dissolved	**0.19**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000087J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:41	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	**0.00017J**	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:28	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**96.9**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.2**	mg/L	2.5	1.2	1		10/01/13 12:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0868-091713 **Lab ID: 10243059037** Collected: 09/20/13 16:01 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0091**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 17:16	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 17:16	7440-43-9	
Copper	**0.091**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 17:16	7440-50-8	
Lead	**0.076**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 17:16	7439-92-1	
Zinc	**0.53**	mg/L	0.025	0.0049	5	10/09/13 00:00	10/09/13 17:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0030**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:46	7440-38-2	
Cadmium, Dissolved	**0.00059**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:46	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:46	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:46	7439-92-1	
Zinc, Dissolved	**0.23**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000071J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:34	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**82.0**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.4**	mg/L	2.5	1.2	1		10/01/13 12:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0869-091713 **Lab ID: 10243059038** Collected: 09/20/13 16:08 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/09/13 17:42	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/09/13 17:42	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/09/13 17:42	7440-50-8	
Lead	**0.099**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/09/13 17:42	7439-92-1	
Zinc	**0.59**	mg/L	0.025	0.0049	5	10/09/13 00:00	10/09/13 17:46	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0030**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:49	7440-38-2	
Cadmium, Dissolved	**0.00041**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:49	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:49	7440-50-8	
Lead, Dissolved	**0.0019**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:49	7439-92-1	
Zinc, Dissolved	**0.17**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:36	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0870-091713 **Lab ID: 10243059039** Collected: 09/20/13 16:15 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 15:03	7440-38-2	
Cadmium	**0.00063**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 15:03	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 15:03	7440-50-8	
Lead	**0.050**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 15:03	7439-92-1	
Zinc	**0.23**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 15:03	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0051**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:51	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:51	7440-43-9	
Copper, Dissolved	**0.031**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:51	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:51	7439-92-1	
Zinc, Dissolved	**0.036**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:38	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0871-091713 **Lab ID: 10243059040** Collected: 09/20/13 16:21 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/09/13 00:00	10/10/13 15:08	7440-38-2	
Cadmium	**0.00056**	mg/L	0.000080	0.000032	1	10/09/13 00:00	10/10/13 15:08	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	10/09/13 00:00	10/10/13 15:08	7440-50-8	
Lead	**0.039**	mg/L	0.00010	0.000046	1	10/09/13 00:00	10/10/13 15:08	7439-92-1	
Zinc	**0.22**	mg/L	0.0050	0.00098	1	10/09/13 00:00	10/10/13 15:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0061**	mg/L	0.00050	0.000093	1	10/05/13 07:01	10/08/13 12:54	7440-38-2	
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	10/05/13 07:01	10/08/13 12:54	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.00050	0.00017	1	10/05/13 07:01	10/08/13 12:54	7440-50-8	
Lead, Dissolved	**0.00099**	mg/L	0.00010	0.000046	1	10/05/13 07:01	10/08/13 12:54	7439-92-1	
Zinc, Dissolved	**0.041**	mg/L	0.0050	0.00098	1	10/05/13 07:01	10/08/13 12:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00011J**	mg/L	0.00020	0.000030	1	10/05/13 13:17	10/08/13 12:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/04/13 14:20	10/04/13 18:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**108**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.8**	mg/L	2.5	1.2	1		10/01/13 12:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0872-091713 **Lab ID: 10243059041** Collected: 09/20/13 16:28 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:00	7440-38-2	
Cadmium	**0.00042**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:00	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:00	7440-50-8	
Lead	**0.029**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:00	7439-92-1	
Zinc	**0.12**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:00	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0074**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 16:22	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 16:22	7440-43-9	
Copper, Dissolved	**0.062**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 16:22	7440-50-8	
Lead, Dissolved	**0.00051**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 16:22	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 16:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 11:49	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:13	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**66.4**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**24.9**	mg/L	2.5	1.2	1		10/01/13 12:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0873-091713 **Lab ID: 10243059042** Collected: 09/20/13 16:39 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.094**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 11:54	7440-38-2	
Cadmium	**0.0071**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 11:54	7440-43-9	
Copper	**1.1**	mg/L	0.0050	0.0017	10	10/05/13 12:21	10/09/13 14:50	7440-50-8	
Lead	**0.59**	mg/L	0.0010	0.00046	10	10/05/13 12:21	10/09/13 14:50	7439-92-1	
Zinc	**1.8**	mg/L	0.050	0.0098	10	10/05/13 12:21	10/09/13 14:50	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.011**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 16:32	7440-38-2	
Cadmium, Dissolved	**0.00071**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 16:32	7440-43-9	
Copper, Dissolved	**0.057**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 16:32	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 16:32	7439-92-1	
Zinc, Dissolved	**0.064**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 16:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.0013**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 11:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:15	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**448**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**18.9**	mg/L	2.5	1.2	1		10/01/13 12:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0874-091713 **Lab ID: 10243059043** Collected: 09/20/13 16:51 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:32	7440-38-2	
Cadmium	**0.00064**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:32	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:32	7440-50-8	
Lead	**0.049**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:32	7439-92-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:32	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0083**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 16:42	7440-38-2	
Cadmium, Dissolved	**0.00012**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 16:42	7440-43-9	
Copper, Dissolved	**0.038**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 16:42	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 16:42	7439-92-1	
Zinc, Dissolved	**0.017**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 16:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:04	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:27	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**110**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.3**	mg/L	2.5	1.2	1		10/01/13 12:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0875-091713 **Lab ID: 10243059044** Collected: 09/20/13 16:55 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.023**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:37	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:37	7440-43-9	
Copper	**0.35**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:37	7440-50-8	
Lead	**0.090**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:37	7439-92-1	
Zinc	**0.31**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0065**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:21	7440-38-2	
Cadmium, Dissolved	**0.00012**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:21	7440-43-9	
Copper, Dissolved	**0.031**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:21	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:21	7439-92-1	
Zinc, Dissolved	**0.014**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000082J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**209**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.4**	mg/L	2.5	1.2	1		10/01/13 12:16	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0876-091713 **Lab ID: 10243059045** Collected: 09/20/13 17:00 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:43	7440-38-2	
Cadmium	**0.00082**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:43	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:43	7440-50-8	
Lead	**0.081**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:43	7439-92-1	
Zinc	**0.30**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:43	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0036**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:26	7440-38-2	
Cadmium, Dissolved	**0.00011**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:26	7440-43-9	
Copper, Dissolved	**0.019**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:26	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:26	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00028**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:09	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:32	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**145**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.3**	mg/L	2.5	1.2	1		10/01/13 12:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0877-091713 **Lab ID: 10243059046** Collected: 09/20/13 17:07 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:49	7440-38-2	
Cadmium	**0.00073**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:49	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:49	7440-50-8	
Lead	**0.057**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:49	7439-92-1	
Zinc	**0.19**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:49	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0088**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:31	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:31	7440-43-9	
Copper, Dissolved	**0.045**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:31	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:31	7439-92-1	
Zinc, Dissolved	**0.030**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000055J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:11	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:35	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**81.4**	mg/L	10.0	5.0	1		09/30/13 12:48		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**28.6**	mg/L	2.5	1.2	1		10/01/13 12:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0878-091713 **Lab ID: 10243059047** Collected: 09/20/13 17:09 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:54	7440-38-2	
Cadmium	**0.00092**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:54	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:54	7440-50-8	
Lead	**0.055**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:54	7439-92-1	
Zinc	**0.19**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:54	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0089**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:36	7440-38-2	
Cadmium, Dissolved	**0.00025**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:36	7440-43-9	
Copper, Dissolved	**0.044**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:36	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:36	7439-92-1	
Zinc, Dissolved	**0.031**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000058J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:14	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:37	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**74.7**	mg/L	10.0	5.0	1		09/30/13 12:53		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**28.4**	mg/L	2.5	1.2	1		10/01/13 12:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0879-091713 **Lab ID: 10243059048** Collected: 09/20/13 17:11 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 12:59	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 12:59	7440-43-9	
Copper	**0.00044J**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 12:59	7440-50-8	
Lead	**0.000063J**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 12:59	7439-92-1	
Zinc	**0.0029J**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 12:59	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:41	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:41	7440-43-9	
Copper, Dissolved	**0.00023J**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:41	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:41	7439-92-1	
Zinc, Dissolved	ND	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:16	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/30/13 12:53		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		10/01/13 12:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0880-091713 **Lab ID: 10243059049** Collected: 09/23/13 09:36 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:05	7440-38-2	
Cadmium	**0.00074**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:05	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:05	7440-50-8	
Lead	**0.073**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:05	7439-92-1	
Zinc	**0.24**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 13:05	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:46	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:46	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:46	7440-50-8	
Lead, Dissolved	**0.0017**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:46	7439-92-1	
Zinc, Dissolved	**0.042**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:42	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**67.1**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.3**	mg/L	2.5	1.2	1		10/01/13 12:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0881-091713 **Lab ID: 10243059050** Collected: 09/23/13 09:43 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:10	7440-38-2	
Cadmium	**0.00077**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:10	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:10	7440-50-8	
Lead	**0.076**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:10	7439-92-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 13:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0041**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:51	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:51	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:51	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:51	7439-92-1	
Zinc, Dissolved	**0.039**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00024**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:49	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**76.7**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.0**	mg/L	2.5	1.2	1		10/01/13 12:20	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0882-091713 **Lab ID: 10243059051** Collected: 09/23/13 09:47 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:16	7440-38-2	
Cadmium	**0.00065**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:16	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:16	7440-50-8	
Lead	**0.058**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:16	7439-92-1	
Zinc	**0.33**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 13:16	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0049**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 17:56	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 17:56	7440-43-9	
Copper, Dissolved	**0.033**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 17:56	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 17:56	7439-92-1	
Zinc, Dissolved	**0.065**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 17:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00026**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:52	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**109**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.9**	mg/L	2.5	1.2	1		10/01/13 12:20	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0883-091713 **Lab ID: 10243059052** Collected: 09/23/13 09:50 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:38	7440-38-2	
Cadmium	**0.00033**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:38	7440-43-9	
Copper	**0.037**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:38	7440-50-8	
Lead	**0.0091**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:38	7439-92-1	
Zinc	**0.051**	mg/L	0.0050	0.00098	1	10/05/13 12:21	10/09/13 13:38	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.019**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 18:01	7440-38-2	
Cadmium, Dissolved	**0.00015**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 18:01	7440-43-9	
Copper, Dissolved	**0.022**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 18:01	7440-50-8	
Lead, Dissolved	**0.00081**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 18:01	7439-92-1	
Zinc, Dissolved	**0.015**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 18:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:31	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:54	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**17.8**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**23.1**	mg/L	2.5	1.2	1		10/01/13 12:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0884-091713 **Lab ID: 10243059053** Collected: 09/23/13 09:58 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:43	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:43	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:43	7440-50-8	
Lead	**0.14**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:43	7439-92-1	
Zinc	**0.66**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 14:56	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0084**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 18:23	7440-38-2	
Cadmium, Dissolved	**0.00018**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 18:23	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 18:23	7440-50-8	
Lead, Dissolved	**0.0015**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 18:23	7439-92-1	
Zinc, Dissolved	**0.040**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 18:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000086J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:33	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:57	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0885-091713 **Lab ID: 10243059054** Collected: 09/23/13 10:00 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:49	7440-38-2	
Cadmium	**0.0032**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:49	7440-43-9	
Copper	**0.30**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:49	7440-50-8	
Lead	**0.26**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:49	7439-92-1	
Zinc	**1.3**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0066**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 18:33	7440-38-2	
Cadmium, Dissolved	**0.00011**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 18:33	7440-43-9	
Copper, Dissolved	**0.018**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 18:33	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 18:33	7439-92-1	
Zinc, Dissolved	**0.020**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 18:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00016J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 13:59	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0886-091713 **Lab ID: 10243059055** Collected: 09/23/13 10:04 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 13:55	7440-38-2	
Cadmium	**0.0022**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 13:55	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 13:55	7440-50-8	
Lead	**0.16**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 13:55	7439-92-1	
Zinc	**0.90**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:06	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0066**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 18:43	7440-38-2	
Cadmium, Dissolved	**0.00010**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 18:43	7440-43-9	
Copper, Dissolved	**0.017**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 18:43	7440-50-8	
Lead, Dissolved	**0.00096**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 18:43	7439-92-1	
Zinc, Dissolved	**0.024**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 18:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000094J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:38	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 14:02	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0887-091713 **Lab ID: 10243059056** Collected: 09/23/13 10:06 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 14:00	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 14:00	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 14:00	7440-50-8	
Lead	**0.12**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 14:00	7439-92-1	
Zinc	**0.69**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0060**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 18:53	7440-38-2	
Cadmium, Dissolved	**0.00015**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 18:53	7440-43-9	
Copper, Dissolved	**0.017**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 18:53	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 18:53	7439-92-1	
Zinc, Dissolved	**0.027**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 18:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000078J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:41	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 14:04	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**228**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.9**	mg/L	2.5	1.2	1		10/01/13 12:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0888-091713 **Lab ID: 10243059057** Collected: 09/23/13 10:10 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 14:05	7440-38-2	
Cadmium	**0.0016**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 14:05	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 14:05	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 14:05	7439-92-1	
Zinc	**0.64**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:16	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0060**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 19:03	7440-38-2	
Cadmium, Dissolved	**0.00021**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 19:03	7440-43-9	
Copper, Dissolved	**0.023**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 19:03	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 19:03	7439-92-1	
Zinc, Dissolved	**0.062**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 19:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 14:12	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0889-091713 **Lab ID: 10243059058** Collected: 09/23/13 10:14 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.017**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 14:11	7440-38-2	
Cadmium	**0.0018**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 14:11	7440-43-9	
Copper	**0.16**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 14:11	7440-50-8	
Lead	**0.10**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 14:11	7439-92-1	
Zinc	**0.69**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0064**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 19:30	7440-38-2	
Cadmium, Dissolved	**0.00024**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 19:30	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 19:30	7440-50-8	
Lead, Dissolved	**0.0010**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 19:30	7439-92-1	
Zinc, Dissolved	**0.060**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 19:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00011J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:50	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 14:14	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**186**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.2**	mg/L	2.5	1.2	1		10/01/13 12:38	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0890-091713 **Lab ID: 10243059059** Collected: 09/23/13 10:18 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 14:16	7440-38-2	
Cadmium	**0.0021**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 14:16	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 14:16	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 14:16	7439-92-1	
Zinc	**0.75**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:26	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0066**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 19:40	7440-38-2	
Cadmium, Dissolved	**0.00020**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 19:40	7440-43-9	
Copper, Dissolved	**0.029**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 19:40	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 19:40	7439-92-1	
Zinc, Dissolved	**0.044**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 19:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000073J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 14:16	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**254**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.5**	mg/L	2.5	1.2	1		10/01/13 12:41	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0891-091713 **Lab ID: 10243059060** Collected: 09/23/13 10:24 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.018**	mg/L	0.00050	0.000093	1	10/05/13 12:21	10/09/13 14:22	7440-38-2	
Cadmium	**0.0022**	mg/L	0.000080	0.000032	1	10/05/13 12:21	10/09/13 14:22	7440-43-9	
Copper	**0.18**	mg/L	0.00050	0.00017	1	10/05/13 12:21	10/09/13 14:22	7440-50-8	
Lead	**0.13**	mg/L	0.00010	0.000046	1	10/05/13 12:21	10/09/13 14:22	7439-92-1	
Zinc	**0.71**	mg/L	0.025	0.0049	5	10/05/13 12:21	10/09/13 15:31	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0064**	mg/L	0.00050	0.000093	1	10/05/13 12:15	10/09/13 19:50	7440-38-2	
Cadmium, Dissolved	**0.00046**	mg/L	0.000080	0.000032	1	10/05/13 12:15	10/09/13 19:50	7440-43-9	
Copper, Dissolved	**0.035**	mg/L	0.00050	0.00017	1	10/05/13 12:15	10/09/13 19:50	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	10/05/13 12:15	10/09/13 19:50	7439-92-1	
Zinc, Dissolved	**0.081**	mg/L	0.0050	0.00098	1	10/05/13 12:15	10/09/13 19:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	10/05/13 13:13	10/07/13 12:55	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/05/13 13:10	10/07/13 14:19	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**263**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.1**	mg/L	2.5	1.2	1		10/01/13 12:41	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0892-091713 **Lab ID: 10243059061** Collected: 09/23/13 10:39 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 16:31	7440-38-2	
Cadmium	**0.00063**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 16:31	7440-43-9	
Copper	**0.10**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 16:31	7440-50-8	
Lead	**0.056**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 16:31	7439-92-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 16:31	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0041**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/07/13 23:27	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/07/13 23:27	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/07/13 23:27	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/07/13 23:27	7439-92-1	
Zinc, Dissolved	**0.030**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/07/13 23:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 14:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:00	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0893-091713 **Lab ID: 10243059062** Collected: 09/23/13 10:42 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 16:34	7440-38-2	
Cadmium	**0.00060**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 16:34	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 16:34	7440-50-8	
Lead	**0.056**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 16:34	7439-92-1	
Zinc	**0.19**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 16:34	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0042**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/07/13 23:36	7440-38-2	
Cadmium, Dissolved	**0.00017**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/07/13 23:36	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/07/13 23:36	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/07/13 23:36	7439-92-1	
Zinc, Dissolved	**0.028**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/07/13 23:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000085J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 14:39	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:03	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**76.2**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.9**	mg/L	2.5	1.2	1		10/01/13 12:41	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0894-091713 **Lab ID: 10243059063** Collected: 09/23/13 10:46 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.010**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/08/13 15:53	7440-38-2	
Cadmium	**0.00058**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/08/13 15:53	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/08/13 15:53	7440-50-8	
Lead	**0.060**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/08/13 15:53	7439-92-1	
Zinc	**0.19**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/08/13 15:53	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0038**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 00:13	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 00:13	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 00:13	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 00:13	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 00:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00014J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 14:51	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:15	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0895-091713 **Lab ID: 10243059064** Collected: 09/23/13 10:49 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0085**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 16:39	7440-38-2	
Cadmium	**0.00062**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 16:39	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 16:39	7440-50-8	
Lead	**0.052**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 16:39	7439-92-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 16:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0040**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 00:22	7440-38-2	
Cadmium, Dissolved	**0.00016**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 00:22	7440-43-9	
Copper, Dissolved	**0.020**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 00:22	7440-50-8	
Lead, Dissolved	**0.0014**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 00:22	7439-92-1	
Zinc, Dissolved	**0.025**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 00:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 14:54	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:17	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0896-091713 **Lab ID: 10243059065** Collected: 09/23/13 10:54 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 16:42	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 16:42	7440-43-9	
Copper	**0.20**	mg/L	0.0025	0.00087	5	10/05/13 16:16	10/10/13 16:44	7440-50-8	
Lead	**0.12**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 16:42	7439-92-1	
Zinc	**0.40**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 16:42	7440-66-6	M1
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0037**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 00:32	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 00:32	7440-43-9	
Copper, Dissolved	**0.023**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 00:32	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 00:32	7439-92-1	
Zinc, Dissolved	**0.026**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 00:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00019J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 14:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:20	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**118**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.8**	mg/L	2.5	1.2	1		10/01/13 12:43	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0897-091713 **Lab ID: 10243059066** Collected: 09/23/13 10:58 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:01	7440-38-2	
Cadmium	**0.00074**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:01	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:01	7440-50-8	
Lead	**0.080**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:01	7439-92-1	
Zinc	**0.27**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0059**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 00:42	7440-38-2	
Cadmium, Dissolved	**0.00022**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 00:42	7440-43-9	
Copper, Dissolved	**0.032**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 00:42	7440-50-8	
Lead, Dissolved	**0.0013**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 00:42	7439-92-1	
Zinc, Dissolved	**0.044**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 00:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000069J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 14:59	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:22	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**117**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.3**	mg/L	2.5	1.2	1		10/01/13 12:43	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0898-091713 **Lab ID: 10243059067** Collected: 09/23/13 11:01 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:04	7440-38-2	
Cadmium	**0.00083**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:04	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:04	7440-50-8	
Lead	**0.054**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:04	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:04	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0036**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 00:51	7440-38-2	
Cadmium, Dissolved	**0.00026**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 00:51	7440-43-9	
Copper, Dissolved	**0.037**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 00:51	7440-50-8	
Lead, Dissolved	**0.00083**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 00:51	7439-92-1	
Zinc, Dissolved	**0.083**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 00:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:01	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:25	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**110**	mg/L	10.0	5.0	1		09/30/13 15:29		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**17.8**	mg/L	2.5	1.2	1		10/01/13 12:43	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0899-091713 **Lab ID: 10243059068** Collected: 09/23/13 11:04 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0075**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:06	7440-38-2	
Cadmium	**0.00097**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:06	7440-43-9	
Copper	**0.20**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/11/13 15:49	7440-50-8	
Lead	**0.038**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:06	7439-92-1	
Zinc	**0.41**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:06	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0029**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 01:16	7440-38-2	
Cadmium, Dissolved	**0.00056**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 01:16	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 01:16	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 01:16	7439-92-1	
Zinc, Dissolved	**0.22**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 01:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:04	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:27	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**88.7**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.0**	mg/L	2.5	1.2	1		10/01/13 12:43	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0900-091713 **Lab ID: 10243059069** Collected: 09/23/13 11:07 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0071**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:09	7440-38-2	
Cadmium	**0.00095**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:09	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/11/13 15:52	7440-50-8	
Lead	**0.036**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:09	7439-92-1	
Zinc	**0.39**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:09	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0030**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 01:26	7440-38-2	
Cadmium, Dissolved	**0.00052**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 01:26	7440-43-9	
Copper, Dissolved	**0.11**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 01:26	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 01:26	7439-92-1	
Zinc, Dissolved	**0.22**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 01:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000042J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:06	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:30	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**97.9**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.7**	mg/L	2.5	1.2	1		10/01/13 12:46	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0901-091713 **Lab ID: 10243059070** Collected: 09/23/13 11:11 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:12	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:12	7440-43-9	
Copper	**0.00030J**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:12	7440-50-8	
Lead	**0.000060J**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:12	7439-92-1	
Zinc	ND	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 01:35	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 01:35	7440-43-9	
Copper, Dissolved	**0.00086**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 01:35	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 01:35	7439-92-1	
Zinc, Dissolved	**0.0017J**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 01:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:13	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:37	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		10/01/13 12:46	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0902-091813 **Lab ID: 10243059071** Collected: 09/23/13 11:28 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.034**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:14	7440-38-2	
Cadmium	**0.098**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:14	7440-43-9	
Copper	**0.68**	mg/L	0.0025	0.00087	5	10/05/13 16:16	10/11/13 15:54	7440-50-8	
Lead	**0.36**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:14	7439-92-1	
Zinc	**41.8**	mg/L	0.50	0.098	100	10/05/13 16:16	10/10/13 17:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0020**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 01:45	7440-38-2	
Cadmium, Dissolved	**0.10**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 01:45	7440-43-9	
Copper, Dissolved	**0.22**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 01:45	7440-50-8	
Lead, Dissolved	**0.00050**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 01:45	7439-92-1	
Zinc, Dissolved	**34.7**	mg/L	0.50	0.098	100	10/06/13 08:45	10/08/13 16:06	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:16	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**106**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**396**	mg/L	62.5	31.2	25		10/01/13 13:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0903-091813 **Lab ID: 10243059072** Collected: 09/23/13 11:30 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:20	7440-38-2	
Cadmium	**0.00089**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:20	7440-43-9	
Copper	**0.13**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:20	7440-50-8	
Lead	**0.097**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:20	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0043**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 02:16	7440-38-2	
Cadmium, Dissolved	**0.00011**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 02:16	7440-43-9	
Copper, Dissolved	**0.018**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 02:16	7440-50-8	
Lead, Dissolved	**0.0021**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 02:16	7439-92-1	
Zinc, Dissolved	**0.021**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 02:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00019J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:18	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:42	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**108**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.4**	mg/L	2.5	1.2	1		10/01/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0904-091813 **Lab ID: 10243059073** Collected: 09/23/13 11:35 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:25	7440-38-2	
Cadmium	**0.0015**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:25	7440-43-9	
Copper	**0.22**	mg/L	0.0025	0.00087	5	10/05/13 16:16	10/10/13 17:36	7440-50-8	
Lead	**0.16**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:25	7439-92-1	
Zinc	**0.49**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/10/13 17:36	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0044**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 02:25	7440-38-2	
Cadmium, Dissolved	**0.00012**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 02:25	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 02:25	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 02:25	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 02:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000095J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:21	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:45	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**200**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.2**	mg/L	2.5	1.2	1		10/01/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0905-091813 **Lab ID: 10243059074** Collected: 09/23/13 11:38 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:39	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:39	7440-43-9	
Copper	**0.23**	mg/L	0.0025	0.00087	5	10/05/13 16:16	10/10/13 17:41	7440-50-8	
Lead	**0.18**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:39	7439-92-1	
Zinc	**0.51**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/10/13 17:41	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0048**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 02:35	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 02:35	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 02:35	7440-50-8	
Lead, Dissolved	**0.0025**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 02:35	7439-92-1	
Zinc, Dissolved	**0.030**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 02:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000083J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:47	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**221**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.9**	mg/L	2.5	1.2	1		10/01/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0906-091813 **Lab ID: 10243059075** Collected: 09/23/13 11:44 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:44	7440-38-2	
Cadmium	**0.00077**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:44	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:44	7440-50-8	
Lead	**0.072**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:44	7439-92-1	
Zinc	**0.26**	mg/L	0.0050	0.00098	1	10/05/13 16:16	10/10/13 17:44	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0048**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 02:45	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 02:45	7440-43-9	
Copper, Dissolved	**0.021**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 02:45	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 02:45	7439-92-1	
Zinc, Dissolved	**0.027**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 02:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000061J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:49	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**100**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.0**	mg/L	2.5	1.2	1		10/01/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0907-091813 **Lab ID: 10243059076** Collected: 09/23/13 11:48 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:47	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:47	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:47	7440-50-8	
Lead	**0.089**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:47	7439-92-1	
Zinc	**0.46**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/14/13 17:08	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0063**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 02:54	7440-38-2	
Cadmium, Dissolved	**0.00010**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 02:54	7440-43-9	
Copper, Dissolved	**0.016**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 02:54	7440-50-8	
Lead, Dissolved	**0.0012**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 02:54	7439-92-1	
Zinc, Dissolved	**0.020**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 02:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000085J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:52	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0908-091813 **Lab ID: 10243059077** Collected: 09/23/13 11:51 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:49	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:49	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/10/13 17:49	7440-50-8	
Lead	**0.12**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:49	7439-92-1	
Zinc	**0.59**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/14/13 17:11	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0058**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 03:19	7440-38-2	
Cadmium, Dissolved	**0.000058J**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 03:19	7440-43-9	
Copper, Dissolved	**0.016**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 03:19	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 03:19	7439-92-1	
Zinc, Dissolved	**0.013**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 03:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000048J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 16:59	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**247**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.3**	mg/L	2.5	1.2	1		10/01/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0909-091813 **Lab ID: 10243059078** Collected: 09/23/13 11:54 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:52	7440-38-2	
Cadmium	**0.0019**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:52	7440-43-9	
Copper	**0.26**	mg/L	0.0025	0.00087	5	10/05/13 16:16	10/11/13 15:57	7440-50-8	
Lead	**0.15**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/10/13 17:52	7439-92-1	
Zinc	**0.73**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/11/13 15:57	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0066**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 03:29	7440-38-2	
Cadmium, Dissolved	**0.00010**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 03:29	7440-43-9	
Copper, Dissolved	**0.022**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 03:29	7440-50-8	
Lead, Dissolved	**0.00086**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 03:29	7439-92-1	
Zinc, Dissolved	**0.012**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 03:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000036J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:38	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 17:02	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**400**	mg/L	10.0	5.0	1		10/03/13 08:37		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**10.4**	mg/L	2.5	1.2	1		10/01/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0910-091813 **Lab ID: 10243059079** Collected: 09/23/13 12:03 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.064**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/10/13 17:55	7440-38-2	
Cadmium	**0.0040**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/10/13 17:55	7440-43-9	
Copper	**0.47**	mg/L	0.0025	0.00087	5	10/05/13 16:16	10/11/13 16:00	7440-50-8	
Lead	**1.0**	mg/L	0.00050	0.00023	5	10/05/13 16:16	10/11/13 16:00	7439-92-1	
Zinc	**1.2**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/11/13 16:00	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0049**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 03:39	7440-38-2	
Cadmium, Dissolved	**0.000082**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 03:39	7440-43-9	
Copper, Dissolved	**0.015**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 03:39	7440-50-8	
Lead, Dissolved	**0.0027**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 03:39	7439-92-1	
Zinc, Dissolved	**0.022**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 03:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00044**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:40	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 17:04	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**395**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.2**	mg/L	2.5	1.2	1		10/01/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0911-091813 **Lab ID: 10243059080** Collected: 09/23/13 12:07 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	10/05/13 16:16	10/11/13 16:03	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	10/05/13 16:16	10/11/13 16:03	7440-43-9	
Copper	**0.14**	mg/L	0.00050	0.00017	1	10/05/13 16:16	10/11/13 16:03	7440-50-8	
Lead	**0.20**	mg/L	0.00010	0.000046	1	10/05/13 16:16	10/11/13 16:03	7439-92-1	
Zinc	**0.65**	mg/L	0.025	0.0049	5	10/05/13 16:16	10/11/13 16:06	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0040**	mg/L	0.00050	0.000093	1	10/06/13 08:45	10/08/13 03:48	7440-38-2	
Cadmium, Dissolved	**0.00030**	mg/L	0.000080	0.000032	1	10/06/13 08:45	10/08/13 03:48	7440-43-9	
Copper, Dissolved	**0.019**	mg/L	0.00050	0.00017	1	10/06/13 08:45	10/08/13 03:48	7440-50-8	
Lead, Dissolved	**0.0023**	mg/L	0.00010	0.000046	1	10/06/13 08:45	10/08/13 03:48	7439-92-1	
Zinc, Dissolved	**0.088**	mg/L	0.0050	0.00098	1	10/06/13 08:45	10/08/13 03:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000092J**	mg/L	0.00020	0.000030	1	10/05/13 20:55	10/07/13 15:43	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:31	10/07/13 17:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**162**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**7.3**	mg/L	2.5	1.2	1		10/01/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0912-091813 **Lab ID: 10243059081** Collected: 09/23/13 12:10 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.019**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 14:37	7440-38-2	
Cadmium	**0.0032**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 14:37	7440-43-9	
Copper	**0.19**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 14:37	7440-50-8	
Lead	**0.17**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 14:37	7439-92-1	
Zinc	**1.1**	mg/L	0.025	0.0049	5	10/06/13 12:15	10/08/13 14:42	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0037**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 01:31	7440-38-2	
Cadmium, Dissolved	**0.00070**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 01:31	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 01:31	7440-50-8	
Lead, Dissolved	**0.0027**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 01:31	7439-92-1	
Zinc, Dissolved	**0.30**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 01:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:21	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:25	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**187**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**9.8**	mg/L	2.5	1.2	1		10/01/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0925-091813 **Lab ID: 10243059082** Collected: 09/23/13 13:02 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 14:47	7440-38-2	
Cadmium	**0.0013**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 14:47	7440-43-9	
Copper	**0.045**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 14:47	7440-50-8	
Lead	**0.012**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 14:47	7439-92-1	
Zinc	**0.33**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 14:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 01:43	7440-38-2	
Cadmium, Dissolved	**0.00055**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 01:43	7440-43-9	
Copper, Dissolved	**0.028**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 01:43	7440-50-8	
Lead, Dissolved	**0.00045**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 01:43	7439-92-1	
Zinc, Dissolved	**0.22**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 01:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:24	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:27	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**17.7**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**26.6**	mg/L	5.0	2.5	2		10/01/13 14:00	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0926-091813 **Lab ID: 10243059083** Collected: 09/23/13 13:05 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 14:52	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 14:52	7440-43-9	
Copper	**0.043**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 14:52	7440-50-8	
Lead	**0.012**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 14:52	7439-92-1	
Zinc	**0.32**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 14:52	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 01:45	7440-38-2	
Cadmium, Dissolved	**0.00055**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 01:45	7440-43-9	
Copper, Dissolved	**0.029**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 01:45	7440-50-8	
Lead, Dissolved	**0.00046**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 01:45	7439-92-1	
Zinc, Dissolved	**0.23**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 01:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:36	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:40	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**15.4**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.6**	mg/L	5.0	2.5	2		10/01/13 14:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0927-091813 **Lab ID: 10243059084** Collected: 09/23/13 13:08 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	ND	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 14:57	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 14:57	7440-43-9	
Copper	**0.00064**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 14:57	7440-50-8	
Lead	ND	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 14:57	7439-92-1	
Zinc	**0.0036J**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 14:57	7440-66-6	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	ND	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 01:48	7440-38-2	
Cadmium, Dissolved	ND	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 01:48	7440-43-9	
Copper, Dissolved	**0.00091**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 01:48	7440-50-8	
Lead, Dissolved	ND	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 01:48	7439-92-1	
Zinc, Dissolved	**0.0017J**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 01:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:39	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:42	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	ND	mg/L	2.5	1.2	1		10/01/13 13:45	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0928-091813 **Lab ID: 10243059085** Collected: 09/23/13 13:11 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 15:01	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 15:01	7440-43-9	
Copper	**0.041**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 15:01	7440-50-8	
Lead	**0.011**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 15:01	7439-92-1	
Zinc	**0.31**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 15:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 01:51	7440-38-2	
Cadmium, Dissolved	**0.00056**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 01:51	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 01:51	7440-50-8	
Lead, Dissolved	**0.00041**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 01:51	7439-92-1	
Zinc, Dissolved	**0.22**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 01:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:41	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:44	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11.6**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**27.2**	mg/L	5.0	2.5	2		10/01/13 14:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0929-091813 **Lab ID: 10243059086** Collected: 09/23/13 13:14 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 15:33	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 15:33	7440-43-9	
Copper	**0.043**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 15:33	7440-50-8	
Lead	**0.012**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 15:33	7439-92-1	
Zinc	**0.32**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 15:33	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 02:02	7440-38-2	
Cadmium, Dissolved	**0.00054**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 02:02	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 02:02	7440-50-8	
Lead, Dissolved	**0.00040**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 02:02	7439-92-1	
Zinc, Dissolved	**0.21**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 02:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:44	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:47	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**12.8**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**28.2**	mg/L	2.5	1.2	1		10/01/13 13:48	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0930-091813 **Lab ID: 10243059087** Collected: 09/23/13 13:18 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 15:37	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 15:37	7440-43-9	
Copper	**0.043**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 15:37	7440-50-8	
Lead	**0.012**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 15:37	7439-92-1	
Zinc	**0.30**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 15:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 02:05	7440-38-2	
Cadmium, Dissolved	**0.00054**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 02:05	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 02:05	7440-50-8	
Lead, Dissolved	**0.00038**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 02:05	7439-92-1	
Zinc, Dissolved	**0.20**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 02:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:46	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:49	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11.7**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.8**	mg/L	2.5	1.2	1		10/01/13 13:48	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0931-091813 **Lab ID: 10243059088** Collected: 09/23/13 13:21 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 15:42	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 15:42	7440-43-9	
Copper	**0.042**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 15:42	7440-50-8	
Lead	**0.011**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 15:42	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 15:42	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.012**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 02:08	7440-38-2	
Cadmium, Dissolved	**0.00043**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 02:08	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 02:08	7440-50-8	
Lead, Dissolved	**0.00036**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 02:08	7439-92-1	
Zinc, Dissolved	**0.18**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 02:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:52	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**14.6**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.6**	mg/L	2.5	1.2	1		10/01/13 13:48	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0932-091813 **Lab ID: 10243059089** Collected: 09/23/13 13:24 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 15:47	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 15:47	7440-43-9	
Copper	**0.043**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 15:47	7440-50-8	
Lead	**0.013**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 15:47	7439-92-1	
Zinc	**0.29**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 15:47	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 02:10	7440-38-2	
Cadmium, Dissolved	**0.00044**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 02:10	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 02:10	7440-50-8	
Lead, Dissolved	**0.00036**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 02:10	7439-92-1	
Zinc, Dissolved	**0.19**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 02:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:56	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 17:59	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**15.4**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**29.1**	mg/L	2.5	1.2	1		10/01/13 13:48	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0933-091813 **Lab ID: 10243059090** Collected: 09/23/13 13:26 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.024**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 15:51	7440-38-2	
Cadmium	**0.0032**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 15:51	7440-43-9	
Copper	**0.30**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 15:51	7440-50-8	
Lead	**0.079**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 15:51	7439-92-1	
Zinc	**1.7**	mg/L	0.025	0.0049	5	10/06/13 12:15	10/08/13 15:56	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0035**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 02:13	7440-38-2	
Cadmium, Dissolved	**0.00095**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 02:13	7440-43-9	
Copper, Dissolved	**0.041**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 02:13	7440-50-8	
Lead, Dissolved	**0.0022**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 02:13	7439-92-1	
Zinc, Dissolved	**0.76**	mg/L	0.025	0.0049	5	10/07/13 10:47	10/08/13 10:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000068J**	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 18:58	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 18:02	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**292**	mg/L	10.0	5.0	1		10/01/13 12:00		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**46.7**	mg/L	5.0	2.5	2		10/01/13 14:06	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0924-091813 **Lab ID: 10243059091** Collected: 09/23/13 12:57 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.020**	mg/L	0.00050	0.000093	1	10/06/13 12:15	10/08/13 16:01	7440-38-2	M1
Cadmium	**0.00059**	mg/L	0.000080	0.000032	1	10/06/13 12:15	10/08/13 16:01	7440-43-9	
Copper	**0.31**	mg/L	0.00050	0.00017	1	10/06/13 12:15	10/08/13 16:01	7440-50-8	
Lead	**0.040**	mg/L	0.00010	0.000046	1	10/06/13 12:15	10/08/13 16:01	7439-92-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	10/06/13 12:15	10/08/13 16:01	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0073**	mg/L	0.00050	0.000093	1	10/07/13 10:47	10/08/13 02:16	7440-38-2	
Cadmium, Dissolved	**0.00013**	mg/L	0.000080	0.000032	1	10/07/13 10:47	10/08/13 02:16	7440-43-9	
Copper, Dissolved	**0.054**	mg/L	0.00050	0.00017	1	10/07/13 10:47	10/08/13 02:16	7440-50-8	
Lead, Dissolved	**0.0027**	mg/L	0.00010	0.000046	1	10/07/13 10:47	10/08/13 02:16	7439-92-1	
Zinc, Dissolved	**0.023**	mg/L	0.0050	0.00098	1	10/07/13 10:47	10/08/13 02:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/06/13 08:25	10/07/13 19:01	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/06/13 08:28	10/07/13 18:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**117**	mg/L	10.0	5.0	1		10/01/13 12:01		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**25.7**	mg/L	5.0	2.5	2		10/01/13 14:06	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0913-091813 **Lab ID: 10243059092** Collected: 09/23/13 12:13 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0072**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 14:37	7440-38-2	
Cadmium	**0.00073**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 14:37	7440-43-9	
Copper	**0.090**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 14:37	7440-50-8	
Lead	**0.059**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 14:37	7439-92-1	
Zinc	**0.28**	mg/L	0.0050	0.00098	1	10/07/13 10:45	10/08/13 14:37	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0034**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 03:03	7440-38-2	
Cadmium, Dissolved	**0.00027**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 03:03	7440-43-9	
Copper, Dissolved	**0.024**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 03:03	7440-50-8	
Lead, Dissolved	**0.0016**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 03:03	7439-92-1	
Zinc, Dissolved	**0.092**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 03:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000076J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:23	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 14:45	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0914-091813 **Lab ID: 10243059093** Collected: 09/23/13 12:15 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.0050**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 14:39	7440-38-2	
Cadmium	**0.00055**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 14:39	7440-43-9	
Copper	**0.051**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 14:39	7440-50-8	
Lead	**0.043**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 14:39	7439-92-1	
Zinc	**0.20**	mg/L	0.0050	0.00098	1	10/07/13 10:45	10/08/13 14:39	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0026**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 03:12	7440-38-2	
Cadmium, Dissolved	**0.00020**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 03:12	7440-43-9	
Copper, Dissolved	**0.017**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 03:12	7440-50-8	
Lead, Dissolved	**0.0011**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 03:12	7439-92-1	
Zinc, Dissolved	**0.080**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 03:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000035J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:26	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 14:47	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0915-091813 **Lab ID: 10243059094** Collected: 09/23/13 12:24 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.021**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 14:51	7440-38-2	
Cadmium	**0.0030**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 14:51	7440-43-9	
Copper	**0.22**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 14:51	7440-50-8	
Lead	**0.23**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 14:51	7439-92-1	
Zinc	**1.4**	mg/L	0.025	0.0049	5	10/07/13 10:45	10/09/13 18:10	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0034**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 03:22	7440-38-2	
Cadmium, Dissolved	**0.00034**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 03:22	7440-43-9	
Copper, Dissolved	**0.020**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 03:22	7440-50-8	
Lead, Dissolved	**0.0020**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 03:22	7439-92-1	
Zinc, Dissolved	**0.19**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 03:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00020J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:28	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 14:59	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**547**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**16.0**	mg/L	2.5	1.2	1		10/04/13 08:11	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0916-091813 **Lab ID: 10243059095** Collected: 09/23/13 12:30 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 14:53	7440-38-2	
Cadmium	**0.0014**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 14:53	7440-43-9	
Copper	**0.088**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 14:53	7440-50-8	
Lead	**0.21**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 14:53	7439-92-1	
Zinc	**0.57**	mg/L	0.025	0.0049	5	10/07/13 10:45	10/09/13 18:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0027**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 03:31	7440-38-2	
Cadmium, Dissolved	**0.00019**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 03:31	7440-43-9	
Copper, Dissolved	**0.013**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 03:31	7440-50-8	
Lead, Dissolved	**0.0032**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 03:31	7439-92-1	
Zinc, Dissolved	**0.059**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 03:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00013J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:41	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:02	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**196**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**6.0**	mg/L	2.5	1.2	1		10/04/13 08:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0917-091813 **Lab ID: 10243059096** Collected: 09/23/13 12:34 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.052**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 14:56	7440-38-2	
Cadmium	**0.0033**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 14:56	7440-43-9	
Copper	**0.27**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 14:56	7440-50-8	
Lead	**1.1**	mg/L	0.00050	0.00023	5	10/07/13 10:45	10/09/13 18:15	7439-92-1	
Zinc	**1.4**	mg/L	0.025	0.0049	5	10/07/13 10:45	10/09/13 18:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0016**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 03:40	7440-38-2	
Cadmium, Dissolved	**0.00098**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 03:40	7440-43-9	
Copper, Dissolved	**0.026**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 03:40	7440-50-8	
Lead, Dissolved	**0.0030**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 03:40	7439-92-1	
Zinc, Dissolved	**0.36**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 03:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00043**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:43	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:04	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**350**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**8.4**	mg/L	2.5	1.2	1		10/04/13 08:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0918-091813 **Lab ID: 10243059097** Collected: 09/23/13 12:36 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 15:07	7440-38-2	
Cadmium	**0.0017**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 15:07	7440-43-9	
Copper	**0.11**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 15:07	7440-50-8	
Lead	**0.19**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 15:07	7439-92-1	
Zinc	**0.72**	mg/L	0.025	0.0049	5	10/07/13 10:45	10/09/13 18:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00012J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:45	7439-97-6	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0919-091813 **Lab ID: 10243059098** Collected: 09/23/13 12:42 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 15:09	7440-38-2	
Cadmium	**0.0029**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 15:09	7440-43-9	
Copper	**0.12**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 15:09	7440-50-8	
Lead	**0.25**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 15:09	7439-92-1	
Zinc	**0.99**	mg/L	0.025	0.0049	5	10/07/13 10:45	10/09/13 18:21	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0018**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 04:06	7440-38-2	
Cadmium, Dissolved	**0.00014**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 04:06	7440-43-9	
Copper, Dissolved	**0.012**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 04:06	7440-50-8	
Lead, Dissolved	**0.0010**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 04:06	7439-92-1	
Zinc, Dissolved	**0.049**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 04:06	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00018J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:48	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:07	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**200**	mg/L	10.0	5.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**1.3J**	mg/L	2.5	1.2	1		10/04/13 08:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0920-091813 **Lab ID: 10243059099** Collected: 09/23/13 12:46 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.012**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 15:12	7440-38-2	
Cadmium	**0.00044**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 15:12	7440-43-9	
Copper	**0.15**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 15:12	7440-50-8	
Lead	**0.027**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 15:12	7439-92-1	
Zinc	**0.10**	mg/L	0.0050	0.00098	1	10/07/13 10:45	10/08/13 15:12	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0065**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 04:15	7440-38-2	
Cadmium, Dissolved	**0.000076J**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 04:15	7440-43-9	
Copper, Dissolved	**0.030**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 04:15	7440-50-8	
Lead, Dissolved	**0.00090**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 04:15	7439-92-1	
Zinc, Dissolved	**0.011**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 04:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:50	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:09	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**116**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.8**	mg/L	2.5	1.2	1		10/04/13 08:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0921-091813 **Lab ID: 10243059100** Collected: 09/23/13 12:49 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.013**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 15:15	7440-38-2	
Cadmium	**0.00039**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 15:15	7440-43-9	
Copper	**0.17**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 15:15	7440-50-8	
Lead	**0.029**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 15:15	7439-92-1	
Zinc	**0.12**	mg/L	0.0050	0.00098	1	10/07/13 10:45	10/08/13 15:15	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0063**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 04:24	7440-38-2	
Cadmium, Dissolved	**0.000074J**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 04:24	7440-43-9	
Copper, Dissolved	**0.028**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 04:24	7440-50-8	
Lead, Dissolved	**0.00078**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 04:24	7439-92-1	
Zinc, Dissolved	**0.014**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 04:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 13:53	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:12	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**120**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.6**	mg/L	2.5	1.2	1		10/04/13 08:13	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0922-091813 **Lab ID: 10243059101** Collected: 09/23/13 12:51 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 15:17	7440-38-2	
Cadmium	**0.00047**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 15:17	7440-43-9	
Copper	**0.21**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 15:17	7440-50-8	
Lead	**0.037**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 15:17	7439-92-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	10/07/13 10:45	10/08/13 15:17	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0058**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 04:34	7440-38-2	
Cadmium, Dissolved	**0.000058J**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 04:34	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 04:34	7440-50-8	
Lead, Dissolved	**0.00080**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 04:34	7439-92-1	
Zinc, Dissolved	**0.011**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 04:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000033J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 14:00	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:14	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**145**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**4.7**	mg/L	2.5	1.2	1		10/04/13 08:15	14808-79-8	

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ANALYTICAL RESULTS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Sample: SD0923-091813 **Lab ID: 10243059102** Collected: 09/23/13 12:55 Received: 09/25/13 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.015**	mg/L	0.00050	0.000093	1	10/07/13 10:45	10/08/13 15:20	7440-38-2	
Cadmium	**0.00056**	mg/L	0.000080	0.000032	1	10/07/13 10:45	10/08/13 15:20	7440-43-9	
Copper	**0.26**	mg/L	0.00050	0.00017	1	10/07/13 10:45	10/08/13 15:20	7440-50-8	
Lead	**0.047**	mg/L	0.00010	0.000046	1	10/07/13 10:45	10/08/13 15:20	7439-92-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	10/07/13 10:45	10/08/13 15:20	7440-66-6	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic, Dissolved	**0.0052**	mg/L	0.00050	0.000093	1	10/03/13 09:31	10/06/13 04:43	7440-38-2	
Cadmium, Dissolved	**0.000063J**	mg/L	0.000080	0.000032	1	10/03/13 09:31	10/06/13 04:43	7440-43-9	
Copper, Dissolved	**0.027**	mg/L	0.00050	0.00017	1	10/03/13 09:31	10/06/13 04:43	7440-50-8	
Lead, Dissolved	**0.00063**	mg/L	0.00010	0.000046	1	10/03/13 09:31	10/06/13 04:43	7439-92-1	
Zinc, Dissolved	**0.012**	mg/L	0.0050	0.00098	1	10/03/13 09:31	10/06/13 04:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000051J**	mg/L	0.00020	0.000030	1	10/07/13 11:20	10/08/13 14:03	7439-97-6	
245.1 Mercury, Dissolved	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury, Dissolved	ND	mg/L	0.00020	0.000030	1	10/07/13 11:16	10/08/13 15:21	7439-97-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**154**	mg/L	20.0	10.0	1		10/09/13 08:55		H1
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**5.0**	mg/L	2.5	1.2	1		10/04/13 08:15	14808-79-8	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9329 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

METHOD BLANK: 1533058 — Matrix: Water
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/08/13 10:20	

LABORATORY CONTROL SAMPLE: 1533059

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0057	115	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533060 — 1533061

Parameter	Units	10243059002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00062	.005	.005	0.0058	0.0053	103	93	85-115	9	20	

MATRIX SPIKE SAMPLE: 1533062

Parameter	Units	10243059020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000078J	.005	0.0048	95	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9330 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

METHOD BLANK: 1533067 — Matrix: Water
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/08/13 11:44	

LABORATORY CONTROL SAMPLE: 1533068

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0053	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533069 — 1533070

Parameter	Units	10243059022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000051J	.005	.005	0.0048	0.0048	95	96	85-115	.6	20	

MATRIX SPIKE SAMPLE: 1533071

Parameter	Units	10243059040 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00011J	.005	0.0050	98	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9334 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

METHOD BLANK: 1533096 — Matrix: Water
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/07/13 11:44	

LABORATORY CONTROL SAMPLE: 1533097

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533098 — 1533099

Parameter	Units	10243059042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.0013	.005	.005	0.0066	0.0063	108	100	85-115	6	20	

MATRIX SPIKE SAMPLE: 1533159

Parameter	Units	10243059060 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00012J	.005	0.0048	93	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9336 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

METHOD BLANK: 1533182 Matrix: Water
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/07/13 14:32	

LABORATORY CONTROL SAMPLE: 1533183

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0054	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533184 1533185

Parameter	Units	10243059062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000085J	.005	.005	0.0049	0.0049	96	97	85-115	1	20	

MATRIX SPIKE SAMPLE: 1533186

Parameter	Units	10243059080 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000092J	.005	0.0045	89	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9342 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

METHOD BLANK: 1533742 — Matrix: Water
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/07/13 18:16	

LABORATORY CONTROL SAMPLE: 1533743

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533744 — 1533745

Parameter	Units	10243059082 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0047	97	95	85-115	3	20	

MATRIX SPIKE SAMPLE: 1535103

Parameter	Units	10243059091 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0050	99	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9390 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059097, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

METHOD BLANK: 1538907 Matrix: Water
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059097, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/08/13 13:16	

LABORATORY CONTROL SAMPLE: 1538908

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0056	111	85-115	

MATRIX SPIKE SAMPLE: 1538911

Parameter	Units	10243773109 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000079J	.005	0.0050	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1545415 1545416

Parameter	Units	10243059094 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00020 J	.005	.005	0.0056	0.0055	109	105	85-115	3	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9331 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

METHOD BLANK: 1533074 — Matrix: Water
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	10/04/13 16:28	

LABORATORY CONTROL SAMPLE: 1533075

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0054	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533076 — 1533077

Parameter	Units	10243059002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0051	0.0053	102	106	85-115	5	20	

MATRIX SPIKE SAMPLE: 1533078

Parameter	Units	10243059020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0054	107	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9332 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

METHOD BLANK: 1533081 — Matrix: Water
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	10/04/13 17:38	

LABORATORY CONTROL SAMPLE: 1533082

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0052	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533083 — 1533084

Parameter	Units	10243059022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0053	0.0063	106	125	85-115	16	20	M1

MATRIX SPIKE SAMPLE: 1533085

Parameter	Units	10243059040 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0049	97	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9333 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

METHOD BLANK: 1533087 — Matrix: Water
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	10/07/13 13:08	

LABORATORY CONTROL SAMPLE: 1533088

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533089 — 1533090

Parameter	Units	10243059042 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0051	0.0049	102	97	85-115	5	20	

MATRIX SPIKE SAMPLE: 1533151

Parameter	Units	10243059060 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0053	106	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9335 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

METHOD BLANK: 1533177 — Matrix: Water
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	10/07/13 15:55	

LABORATORY CONTROL SAMPLE: 1533178

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533179 1533180

Parameter	Units	10243059062 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0050	0.0047	100	95	85-115	6	20	

MATRIX SPIKE SAMPLE: 1533181

Parameter	Units	10243059080 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0053	105	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9343 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

METHOD BLANK: 1533748 — Matrix: Water
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	10/07/13 17:20	

LABORATORY CONTROL SAMPLE: 1533749

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1533750 1533751

Parameter	Units	10243059082 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0049	0.0048	98	96	85-115	2	20	

MATRIX SPIKE SAMPLE: 1535069

Parameter	Units	10243059090 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0046	91	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MERP/9381 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury - Dissolved
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

METHOD BLANK: 1538820 — Matrix: Water
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	10/08/13 14:40	

LABORATORY CONTROL SAMPLE: 1538821

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	.005	0.0053	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1538822 1538823

Parameter	Units	10243059093 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	.005	.005	0.0050	0.0052	99	103	85-115	4	20	

MATRIX SPIKE SAMPLE: 1538824

Parameter	Units	10243773109 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	ND	.005	0.0052	104	85-115	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42138 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

METHOD BLANK: 1535070 Matrix: Water
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	10/08/13 18:26	
Cadmium	mg/L	ND	0.000080	10/08/13 18:26	
Calcium	ug/L	ND	20.0	10/08/13 18:26	
Copper	mg/L	ND	0.00050	10/08/13 18:26	
Iron	ug/L	ND	50.0	10/08/13 18:26	
Lead	mg/L	ND	0.00010	10/08/13 18:26	
Magnesium	ug/L	ND	5.0	10/08/13 18:26	
Manganese	ug/L	ND	0.50	10/08/13 18:26	
Potassium	ug/L	5.3J	20.0	10/08/13 18:26	
Sodium	ug/L	ND	50.0	10/08/13 18:26	
Zinc	mg/L	ND	0.0050	10/08/13 18:26	

LABORATORY CONTROL SAMPLE: 1535071

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.086	107	85-115	
Calcium	ug/L	1000	1180	118	85-115	
Copper	mg/L	.08	0.089	112	85-115	
Iron	ug/L	1000	1170	117	85-115	
Lead	mg/L	.08	0.089	111	85-115	
Magnesium	ug/L	1000	1150	115	85-115	
Manganese	ug/L	80	86.4	108	85-115	
Potassium	ug/L	1000	1110	111	85-115	
Sodium	ug/L	1000	1200	120	85-115	
Zinc	mg/L	.08	0.088	110	85-115	

MATRIX SPIKE SAMPLE: 1535074

Parameter	Units	10243059011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.069	.08	0.15	98	70-130	M1
Cadmium	mg/L	0.041	.08	0.13	106	70-130	M1
Calcium	ug/L	65000	1000	60700	-423	70-130	ES
Copper	mg/L	0.89	.08	1.1	225	70-130	M1
Iron	ug/L	16600	1000	18000	140	70-130	
Lead	mg/L	0.87	.08	0.95	96	70-130	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

MATRIX SPIKE SAMPLE: 1535074

Parameter	Units	10243059011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Magnesium	ug/L	16000	1000	17100	117	70-130	
Manganese	ug/L	3130	80	3410	357	70-130	
Potassium	ug/L	7740	1000	7640	-10	70-130	
Sodium	ug/L	4570	1000	5690	111	70-130	
Zinc	mg/L	14.0	.08	14.7	947	70-130	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1544653 1544654

Parameter	Units	10243059004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.020	.08	.08	0.095	0.093	94	91	70-130	2	20	
Cadmium	mg/L	0.0057	.08	.08	0.090	0.088	105	102	70-130	2	20	
Calcium	ug/L	17500	1000	1000	17100	17100	-33	-36	70-130	.2	20	ES
Copper	mg/L	0.19	.08	.08	0.26	0.25	87	75	70-130	4	20	
Iron	ug/L	13800	1000	1000	14100	13700	23	-13	70-130	3	20	
Lead	mg/L	0.55	.08	.08	0.59	0.59	46	41	70-130	.7	20	M1
Magnesium	ug/L	7360	1000	1000	8080	7920	72	55	70-130	2	20	
Manganese	ug/L	2120	80	80	2050	2030	-86	-107	70-130	.8	20	
Potassium	ug/L	5600	1000	1000	6850	6790	125	119	70-130	1	20	
Sodium	ug/L	7590	1000	1000	8170	7960	58	37	70-130	3	20	
Zinc	mg/L	1.8	.08	.08	1.7	1.6	-89	-145	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42140 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

METHOD BLANK: 1535080 — Matrix: Water
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	10/09/13 14:47	
Cadmium	mg/L	ND	0.000080	10/09/13 14:47	
Calcium	mg/L	ND	0.020	10/09/13 14:47	
Copper	mg/L	ND	0.00050	10/09/13 14:47	
Iron	mg/L	ND	0.050	10/09/13 14:47	
Lead	mg/L	ND	0.00010	10/09/13 14:47	
Magnesium	mg/L	0.0025J	0.0050	10/09/13 14:47	
Manganese	mg/L	0.00023J	0.00050	10/09/13 14:47	
Potassium	mg/L	0.0055J	0.020	10/09/13 14:47	
Sodium	mg/L	ND	0.050	10/09/13 14:47	
Zinc	mg/L	ND	0.0050	10/09/13 14:47	

LABORATORY CONTROL SAMPLE: 1535081

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.083	104	85-115	
Cadmium	mg/L	.08	0.080	99	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	0.96	96	85-115	
Lead	mg/L	.08	0.080	100	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Manganese	mg/L	.08	0.079	99	85-115	
Potassium	mg/L	1	1.0	102	85-115	
Sodium	mg/L	1	0.97	97	85-115	
Zinc	mg/L	.08	0.081	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1547735 — 1547736

Parameter	Units	10243059026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.013	.08	.08	0.098	0.097	107	106	70-130	.7	20	
Cadmium	mg/L	0.00050	.08	.08	0.082	0.080	101	99	70-130	2	20	
Calcium	mg/L		1	1	15.0	15.4	13	49	70-130	2	20	
Copper	mg/L	0.10	.08	.08	0.18	0.19	100	101	70-130	.5	20	
Iron	mg/L		1	1	3.1	3.1	110	115	70-130	2	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1547735 1547736

Parameter	Units	10243059026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.029	.08	.08	0.11	0.11	101	100	70-130	.1	20	
Magnesium	mg/L		1	1	4.9	4.9	90	92	70-130	.4	20	
Manganese	mg/L		.08	.08	0.16	0.16	96	100	70-130	2	20	
Potassium	mg/L		1	1	3.9	4.0	88	94	70-130	2	20	
Sodium	mg/L		1	1	3.9	3.9	82	89	70-130	2	20	
Zinc	mg/L	0.18	.08	.08	0.25	0.26	82	92	70-130	3	20	

MATRIX SPIKE SAMPLE: 1547737

Parameter	Units	10243059032 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.010	.08	0.094	105	70-130	
Cadmium	mg/L	0.00039	.08	0.080	100	70-130	
Calcium	mg/L		1	15.7	23	70-130	
Copper	mg/L	0.077	.08	0.16	100	70-130	
Iron	mg/L		1	2.2	97	70-130	
Lead	mg/L	0.025	.08	0.11	100	70-130	
Magnesium	mg/L		1	5.0	80	70-130	
Manganese	mg/L		.08	0.14	96	70-130	
Potassium	mg/L		1	3.9	86	70-130	
Sodium	mg/L		1	4.2	78	70-130	
Zinc	mg/L	0.11	.08	0.18	93	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42141 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

METHOD BLANK: 1535088 Matrix: Water
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	10/09/13 12:27	
Cadmium	mg/L	ND	0.000080	10/09/13 12:27	
Copper	mg/L	ND	0.00050	10/09/13 12:27	
Lead	mg/L	ND	0.00010	10/09/13 12:27	
Zinc	mg/L	ND	0.0050	10/09/13 12:27	

LABORATORY CONTROL SAMPLE: 1535089

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.084	105	85-115	
Cadmium	mg/L	.08	0.084	105	85-115	
Copper	mg/L	.08	0.085	107	85-115	
Lead	mg/L	.08	0.086	107	85-115	
Zinc	mg/L	.08	0.086	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535090 1535091

Parameter	Units	10243059041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.017	.08	.08	0.10	0.10	106	105	70-130	.2	20	
Cadmium	mg/L	0.00042	.08	.08	0.083	0.084	103	104	70-130	.9	20	
Copper	mg/L	0.20	.08	.08	0.29	0.29	109	116	70-130	2	20	
Lead	mg/L	0.029	.08	.08	0.11	0.12	107	108	70-130	.9	20	
Zinc	mg/L	0.12	.08	.08	0.21	0.22	113	129	70-130	6	20	

MATRIX SPIKE SAMPLE: 1535092

Parameter	Units	10243059051 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.011	.08	0.095	105	70-130	
Cadmium	mg/L	0.00065	.08	0.085	105	70-130	
Copper	mg/L	0.12	.08	0.21	107	70-130	
Lead	mg/L	0.058	.08	0.15	109	70-130	
Zinc	mg/L	0.33	.08	0.41	106	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42142 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

METHOD BLANK: 1535093 Matrix: Water
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	10/10/13 16:26	
Cadmium	mg/L	ND	0.000080	10/10/13 16:26	
Copper	mg/L	ND	0.00050	10/10/13 16:26	
Lead	mg/L	ND	0.00010	10/10/13 16:26	
Zinc	mg/L	ND	0.0050	10/10/13 16:26	

LABORATORY CONTROL SAMPLE: 1535094

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Copper	mg/L	.08	0.086	107	85-115	
Lead	mg/L	.08	0.090	113	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1545036 1545037

Parameter	Units	10243059065 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.015	.08	.08	0.095	0.093	100	97	70-130	3	20	
Cadmium	mg/L	0.0011	.08	.08	0.084	0.081	104	100	70-130	4	20	
Copper	mg/L	0.20	.08	.08	0.30	0.28	129	106	70-130	6	20	
Lead	mg/L	0.12	.08	.08	0.22	0.20	120	102	70-130	7	20	
Zinc	mg/L	0.40	.08	.08	0.45	0.44	67	43	70-130	4	20	M1

MATRIX SPIKE SAMPLE: 1545038

Parameter	Units	10243059072 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.013	.08	0.090	97	70-130	
Cadmium	mg/L	0.00089	.08	0.082	102	70-130	
Copper	mg/L	0.13	.08	0.21	91	70-130	
Lead	mg/L	0.097	.08	0.19	114	70-130	
Zinc	mg/L	0.29	.08	0.37	93	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42143 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

METHOD BLANK: 1535098 Matrix: Water
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	10/08/13 14:33	
Cadmium	mg/L	ND	0.000080	10/08/13 14:33	
Copper	mg/L	ND	0.00050	10/08/13 14:33	
Lead	mg/L	ND	0.00010	10/08/13 14:33	
Zinc	mg/L	0.00099J	0.0050	10/08/13 14:33	

LABORATORY CONTROL SAMPLE: 1535099

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.086	107	85-115	
Cadmium	mg/L	.08	0.088	109	85-115	
Copper	mg/L	.08	0.088	110	85-115	
Lead	mg/L	.08	0.086	107	85-115	
Zinc	mg/L	.08	0.090	113	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535100 1535101

Parameter	Units	10243059081 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.019	.08	.08	0.10	0.10	103	104	70-130	.8	20	
Cadmium	mg/L	0.0032	.08	.08	0.088	0.087	107	105	70-130	1	20	
Copper	mg/L	0.19	.08	.08	0.27	0.28	102	108	70-130	1	20	
Lead	mg/L	0.17	.08	.08	0.25	0.25	107	106	70-130	.3	20	
Zinc	mg/L	1.1	.08	.08	1.2	1.2	78	106	70-130	2	20	E

MATRIX SPIKE SAMPLE: 1535102

Parameter	Units	10243059091 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.020	.08	0.020	.6	70-130	M1
Cadmium	mg/L	0.00059	.08	0.088	109	70-130	
Copper	mg/L	0.31	.08	0.41	125	70-130	
Lead	mg/L	0.040	.08	0.13	108	70-130	
Zinc	mg/L	0.18	.08	0.27	116	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42183 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059097, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

METHOD BLANK: 1536706 — Matrix: Water
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059097, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	10/08/13 14:31	
Cadmium	mg/L	ND	0.000080	10/08/13 14:31	
Copper	mg/L	ND	0.00050	10/08/13 14:31	
Lead	mg/L	ND	0.00010	10/08/13 14:31	
Zinc	mg/L	ND	0.0050	10/08/13 14:31	

LABORATORY CONTROL SAMPLE: 1536707

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.08	0.086	107	85-115	
Cadmium	mg/L	.08	0.077	97	85-115	
Copper	mg/L	.08	0.090	112	85-115	
Lead	mg/L	.08	0.086	108	85-115	
Zinc	mg/L	.08	0.079	99	85-115	

MATRIX SPIKE SAMPLE: 1536710

Parameter	Units	10243059102 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.015	.08	0.10	108	70-130	
Cadmium	mg/L	0.00056	.08	0.082	102	70-130	
Copper	mg/L	0.26	.08	0.36	118	70-130	
Lead	mg/L	0.047	.08	0.13	109	70-130	
Zinc	mg/L	0.18	.08	0.27	106	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1545195 1545196

Parameter	Units	10243059093 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.0050	.08	.08	0.090	0.092	107	109	70-130	2	20	
Cadmium	mg/L	0.00055	.08	.08	0.078	0.082	97	102	70-130	5	20	
Copper	mg/L	0.051	.08	.08	0.13	0.14	100	107	70-130	4	20	
Lead	mg/L	0.043	.08	.08	0.13	0.13	104	106	70-130	.9	20	
Zinc	mg/L	0.20	.08	.08	0.27	0.28	90	96	70-130	2	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42133 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

METHOD BLANK: 1535044 — Matrix: Water
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059013, 10243059014, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	10/08/13 20:45	
Cadmium, Dissolved	mg/L	ND	0.000080	10/08/13 20:45	
Copper, Dissolved	mg/L	0.00023J	0.00050	10/08/13 20:45	
Lead, Dissolved	mg/L	ND	0.00010	10/08/13 20:45	
Zinc, Dissolved	mg/L	ND	0.0050	10/08/13 20:45	

LABORATORY CONTROL SAMPLE: 1535045

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.075	94	85-115	
Cadmium, Dissolved	mg/L	.08	0.079	99	85-115	
Copper, Dissolved	mg/L	.08	0.083	104	85-115	
Lead, Dissolved	mg/L	.08	0.082	102	85-115	
Zinc, Dissolved	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE SAMPLE: 1535048

Parameter	Units	10243059011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0026	.08	0.080	96	70-130	
Cadmium, Dissolved	mg/L	0.033	.08	0.12	104	70-130	
Copper, Dissolved	mg/L	0.093	.08	0.17	94	70-130	
Lead, Dissolved	mg/L	0.00072	.08	0.081	100	70-130	
Zinc, Dissolved	mg/L	11.2	.08	11.1	-76	70-130	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1544640 — 1544641

Parameter	Units	10243059004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0033	.08	.08	0.086	0.088	103	105	70-130	2	20	
Cadmium, Dissolved	mg/L	0.0011	.08	.08	0.089	0.091	110	112	70-130	2	20	
Copper, Dissolved	mg/L	0.024	.08	.08	0.11	0.11	104	104	70-130	.07	20	
Lead, Dissolved	mg/L	0.0065	.08	.08	0.092	0.094	107	109	70-130	2	20	
Zinc, Dissolved	mg/L	0.27	.08	.08	0.36	0.36	111	112	70-130	.4	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42134 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

METHOD BLANK: 1535049 — Matrix: Water
Associated Lab Samples: 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059038, 10243059039, 10243059040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	10/08/13 11:39	
Cadmium, Dissolved	mg/L	ND	0.000080	10/08/13 11:39	
Copper, Dissolved	mg/L	ND	0.00050	10/08/13 11:39	
Lead, Dissolved	mg/L	0.000075J	0.00010	10/08/13 11:39	
Zinc, Dissolved	mg/L	0.0012J	0.0050	10/08/13 11:39	

LABORATORY CONTROL SAMPLE: 1535050

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.085	106	85-115	
Cadmium, Dissolved	mg/L	.08	0.084	105	85-115	
Copper, Dissolved	mg/L	.08	0.078	97	85-115	
Lead, Dissolved	mg/L	.08	0.090	113	85-115	
Zinc, Dissolved	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE SAMPLE: 1535053

Parameter	Units	10243059031 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0070	.08	0.094	108	70-130	
Cadmium, Dissolved	mg/L	0.00018	.08	0.089	110	70-130	
Copper, Dissolved	mg/L	0.035	.08	0.13	118	70-130	
Lead, Dissolved	mg/L	0.0015	.08	0.092	113	70-130	
Zinc, Dissolved	mg/L	0.048	.08	0.13	98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1544821 1544822

Parameter	Units	10243059024 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0067	.08	.08	0.092	0.091	107	106	70-130	.9	20	
Cadmium, Dissolved	mg/L	0.00033	.08	.08	0.089	0.087	110	108	70-130	2	20	
Copper, Dissolved	mg/L	0.043	.08	.08	0.13	0.13	114	109	70-130	3	20	
Lead, Dissolved	mg/L	0.0019	.08	.08	0.091	0.091	111	111	70-130	.2	20	
Zinc, Dissolved	mg/L	0.068	.08	.08	0.15	0.15	105	100	70-130	3	20	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42135 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

METHOD BLANK: 1535054 — Matrix: Water
Associated Lab Samples: 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059053, 10243059054, 10243059055, 10243059056, 10243059057, 10243059058, 10243059059, 10243059060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	10/09/13 17:16	
Cadmium, Dissolved	mg/L	ND	0.000080	10/09/13 17:16	
Copper, Dissolved	mg/L	ND	0.00050	10/09/13 17:16	
Lead, Dissolved	mg/L	ND	0.00010	10/09/13 17:16	
Zinc, Dissolved	mg/L	0.0011J	0.0050	10/09/13 17:16	

LABORATORY CONTROL SAMPLE: 1535055

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.085	106	85-115	
Cadmium, Dissolved	mg/L	.08	0.084	105	85-115	
Copper, Dissolved	mg/L	.08	0.086	107	85-115	
Lead, Dissolved	mg/L	.08	0.086	108	85-115	
Zinc, Dissolved	mg/L	.08	0.086	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535056 1535057

Parameter	Units	10243059041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0074	.08	.08	0.095	0.094	110	109	70-130	.8	20	
Cadmium, Dissolved	mg/L	0.00013	.08	.08	0.086	0.087	108	108	70-130	.3	20	
Copper, Dissolved	mg/L	0.062	.08	.08	0.15	0.15	112	109	70-130	2	20	
Lead, Dissolved	mg/L	0.00051	.08	.08	0.089	0.089	110	110	70-130	.2	20	
Zinc, Dissolved	mg/L	0.017	.08	.08	0.11	0.10	111	109	70-130	2	20	

MATRIX SPIKE SAMPLE: 1535058

Parameter	Units	10243059051 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0049	.08	0.092	109	70-130	
Cadmium, Dissolved	mg/L	0.00019	.08	0.087	108	70-130	
Copper, Dissolved	mg/L	0.033	.08	0.12	110	70-130	
Lead, Dissolved	mg/L	0.0016	.08	0.090	111	70-130	
Zinc, Dissolved	mg/L	0.065	.08	0.15	111	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42136 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

METHOD BLANK: 1535059 — Matrix: Water
Associated Lab Samples: 10243059061, 10243059062, 10243059063, 10243059064, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059076, 10243059077, 10243059078, 10243059079, 10243059080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	10/07/13 23:02	
Cadmium, Dissolved	mg/L	ND	0.000080	10/07/13 23:02	
Copper, Dissolved	mg/L	ND	0.00050	10/07/13 23:02	
Lead, Dissolved	mg/L	ND	0.00010	10/07/13 23:02	
Zinc, Dissolved	mg/L	ND	0.0050	10/07/13 23:02	

LABORATORY CONTROL SAMPLE: 1535060

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.081	102	85-115	
Cadmium, Dissolved	mg/L	.08	0.082	103	85-115	
Copper, Dissolved	mg/L	.08	0.082	102	85-115	
Lead, Dissolved	mg/L	.08	0.080	100	85-115	
Zinc, Dissolved	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535061 1535062

Parameter	Units	10243059061 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0041	.08	.08	0.084	0.084	100	100	70-130	0	20	
Cadmium, Dissolved	mg/L	0.00014	.08	.08	0.082	0.081	102	101	70-130	2	20	
Copper, Dissolved	mg/L	0.021	.08	.08	0.10	0.10	102	101	70-130	.7	20	
Lead, Dissolved	mg/L	0.0012	.08	.08	0.080	0.080	98	98	70-130	.1	20	
Zinc, Dissolved	mg/L	0.030	.08	.08	0.11	0.11	99	96	70-130	2	20	

MATRIX SPIKE SAMPLE: 1535063

Parameter	Units	10243059071 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0020	.08	0.083	101	70-130	
Cadmium, Dissolved	mg/L	0.10	.08	0.18	98	70-130	
Copper, Dissolved	mg/L	0.22	.08	0.30	100	70-130	
Lead, Dissolved	mg/L	0.00050	.08	0.077	96	70-130	
Zinc, Dissolved	mg/L	34.7	.08	33.7	-1190	70-130	E,M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42137 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

METHOD BLANK: 1535064 — Matrix: Water
Associated Lab Samples: 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	10/08/13 01:26	
Cadmium, Dissolved	mg/L	ND	0.000080	10/08/13 01:26	
Copper, Dissolved	mg/L	ND	0.00050	10/08/13 01:26	
Lead, Dissolved	mg/L	ND	0.00010	10/08/13 01:26	
Zinc, Dissolved	mg/L	ND	0.0050	10/08/13 01:26	

LABORATORY CONTROL SAMPLE: 1535065

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.083	104	85-115	
Cadmium, Dissolved	mg/L	.08	0.076	95	85-115	
Copper, Dissolved	mg/L	.08	0.090	113	85-115	
Lead, Dissolved	mg/L	.08	0.084	105	85-115	
Zinc, Dissolved	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535066 1535067

Parameter	Units	10243059081 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0037	.08	.08	0.089	0.090	106	108	70-130	2	20	
Cadmium, Dissolved	mg/L	0.00070	.08	.08	0.077	0.077	95	95	70-130	.2	20	
Copper, Dissolved	mg/L	0.024	.08	.08	0.10	0.11	100	108	70-130	6	20	
Lead, Dissolved	mg/L	0.0027	.08	.08	0.083	0.083	100	101	70-130	.2	20	
Zinc, Dissolved	mg/L	0.30	.08	.08	0.36	0.37	81	88	70-130	2	20	

MATRIX SPIKE SAMPLE: 1535068

Parameter	Units	10243059091 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0073	.08	0.097	112	70-130	
Cadmium, Dissolved	mg/L	0.00013	.08	0.080	99	70-130	
Copper, Dissolved	mg/L	0.054	.08	0.13	94	70-130	
Lead, Dissolved	mg/L	0.0027	.08	0.083	101	70-130	
Zinc, Dissolved	mg/L	0.023	.08	0.10	102	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: MPRP/42181 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

METHOD BLANK: 1536690 — Matrix: Water
Associated Lab Samples: 10243059092, 10243059093, 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	10/06/13 10:03	
Cadmium, Dissolved	mg/L	ND	0.000080	10/06/13 10:03	
Copper, Dissolved	mg/L	ND	0.00050	10/06/13 10:03	
Lead, Dissolved	mg/L	ND	0.00010	10/06/13 10:03	
Zinc, Dissolved	mg/L	ND	0.0050	10/06/13 10:03	

LABORATORY CONTROL SAMPLE: 1536691

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	.08	0.084	104	85-115	
Cadmium, Dissolved	mg/L	.08	0.083	104	85-115	
Copper, Dissolved	mg/L	.08	0.083	103	85-115	
Lead, Dissolved	mg/L	.08	0.088	110	85-115	
Zinc, Dissolved	mg/L	.08	0.086	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536692 1536693

Parameter	Units	10243254001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	7.7 ug/L	.08	.08	0.092	0.092	105	105	70-130	.07	20	
Cadmium, Dissolved	mg/L	ND	.08	.08	0.083	0.084	104	104	70-130	.6	20	
Copper, Dissolved	mg/L	3.5 ug/L	.08	.08	0.085	0.086	102	103	70-130	.3	20	
Lead, Dissolved	mg/L	0.052J ug/L	.08	.08	0.086	0.087	107	109	70-130	2	20	
Zinc, Dissolved	mg/L	7.1 ug/L	.08	.08	0.090	0.091	103	105	70-130	2	20	

MATRIX SPIKE SAMPLE: 1536694

Parameter	Units	10243059094 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.0034	.08	0.088	105	70-130	
Cadmium, Dissolved	mg/L	0.00034	.08	0.083	104	70-130	
Copper, Dissolved	mg/L	0.020	.08	0.10	102	70-130	
Lead, Dissolved	mg/L	0.0020	.08	0.088	107	70-130	
Zinc, Dissolved	mg/L	0.19	.08	0.27	107	70-130	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/33876 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10243059018, 10243059034

METHOD BLANK: 1604009 — Matrix: Water
Associated Lab Samples: 10243059018, 10243059034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/03/14 12:08	

LABORATORY CONTROL SAMPLE & LCSD: 1604010 — 1604011

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604012 — 1604013

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	98.8	40	40	138	141	98	107	80-120	3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604014 — 1604015

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.2	40	40	97.0	98.2	97	100	80-120	1	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32508 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059001, 10243059002

METHOD BLANK: 1536375 | Matrix: Water
Associated Lab Samples: 10243059001, 10243059002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/27/13 09:33	

METHOD BLANK: 1536379 | Matrix: Water
Associated Lab Samples: 10243059001, 10243059002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/27/13 09:33	

LABORATORY CONTROL SAMPLE: 1536376

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	85.8	86	80-120	

SAMPLE DUPLICATE: 1536377

Parameter	Units	10242923007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.9J	ND		10	H1

SAMPLE DUPLICATE: 1536378

Parameter	Units	10243059002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	247	246	.6	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32509 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020, 10243059021, 10243059022, 10243059023, 10243059024

METHOD BLANK: 1536385 — Matrix: Water
Associated Lab Samples: 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020, 10243059021, 10243059022, 10243059023, 10243059024

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/27/13 09:20	

METHOD BLANK: 1536389 — Matrix: Water
Associated Lab Samples: 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009, 10243059010, 10243059011, 10243059012, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020, 10243059021, 10243059022, 10243059023, 10243059024

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/27/13 09:29	

LABORATORY CONTROL SAMPLE: 1536386

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	93.2	93	80-120	

SAMPLE DUPLICATE: 1536387

Parameter	Units	10243059003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	279	278	.3	10	

SAMPLE DUPLICATE: 1536388

Parameter	Units	10243059024 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	213	205	4	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32570 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059040, 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046

METHOD BLANK: 1538368 — Matrix: Water
Associated Lab Samples: 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059040, 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 12:48	

METHOD BLANK: 1538372 — Matrix: Water
Associated Lab Samples: 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031, 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059040, 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 12:48	

LABORATORY CONTROL SAMPLE: 1538369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	88.6	89	80-120	

SAMPLE DUPLICATE: 1538370

Parameter	Units	10243059025 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	50.9	50.0	2	10	H1

SAMPLE DUPLICATE: 1538371

Parameter	Units	10243059046 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	81.4	79.8	2	10	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32571 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059047, 10243059048

METHOD BLANK: 1538373 | Matrix: Water
Associated Lab Samples: 10243059047, 10243059048

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 12:53	

METHOD BLANK: 1538377 | Matrix: Water
Associated Lab Samples: 10243059047, 10243059048

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 12:54	

LABORATORY CONTROL SAMPLE: 1538374

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	96.2	96	80-120	

SAMPLE DUPLICATE: 1538375

Parameter	Units	10243225013 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	10.8	6.1J		10	H1

SAMPLE DUPLICATE: 1538376

Parameter	Units	10243637007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	426	7.8J		10	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32572 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059049, 10243059050, 10243059051, 10243059052, 10243059056, 10243059058, 10243059059, 10243059060, 10243059062, 10243059065, 10243059066, 10243059067

METHOD BLANK: 1538378 Matrix: Water
Associated Lab Samples: 10243059049, 10243059050, 10243059051, 10243059052, 10243059056, 10243059058, 10243059059, 10243059060, 10243059062, 10243059065, 10243059066, 10243059067

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 15:29	

METHOD BLANK: 1538382 Matrix: Water
Associated Lab Samples: 10243059049, 10243059050, 10243059051, 10243059052, 10243059056, 10243059058, 10243059059, 10243059060, 10243059062, 10243059065, 10243059066, 10243059067

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/30/13 15:29	

LABORATORY CONTROL SAMPLE: 1538379

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	89.4	89	80-120	

SAMPLE DUPLICATE: 1538380

Parameter	Units	10243637008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	9.3J		10	H1

SAMPLE DUPLICATE: 1538381

Parameter	Units	10243059067 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	110	115	4	10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32583 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059079, 10243059080, 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

METHOD BLANK: 1539933 — Matrix: Water
Associated Lab Samples: 10243059079, 10243059080, 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/01/13 12:00	

METHOD BLANK: 1539937 — Matrix: Water
Associated Lab Samples: 10243059079, 10243059080, 10243059081, 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/01/13 12:01	

LABORATORY CONTROL SAMPLE: 1539934

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	98.8	99	80-120	

SAMPLE DUPLICATE: 1539935

Parameter	Units	10243059079 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	395	433	9	10	H1

SAMPLE DUPLICATE: 1539936

Parameter	Units	10243335002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.9J	12.8		10	D8,H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32584 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

METHOD BLANK: 1539946 Matrix: Water
Associated Lab Samples: 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/09/13 08:55	

METHOD BLANK: 1539950 Matrix: Water
Associated Lab Samples: 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/09/13 08:55	

LABORATORY CONTROL SAMPLE: 1539947

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	97.6	98	80-120	

SAMPLE DUPLICATE: 1539948

Parameter	Units	10243059094 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	547	498	9	10	H1

SAMPLE DUPLICATE: 1539949

Parameter	Units	10243598018 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	10.0 U	ND		10	D8,H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/32626 — Analysis Method: SM 2540D
QC Batch Method: SM 2540D — Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059077, 10243059078

METHOD BLANK: 1542626 — Matrix: Water
Associated Lab Samples: 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059077, 10243059078

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/03/13 08:37	

METHOD BLANK: 1542630 — Matrix: Water
Associated Lab Samples: 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059077, 10243059078

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/03/13 08:37	

LABORATORY CONTROL SAMPLE: 1542627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	80.0	80	80-120	

SAMPLE DUPLICATE: 1542628

Parameter	Units	10243059070 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	H1

SAMPLE DUPLICATE: 1542629

Parameter	Units	10243712001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	8.9J		10	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WET/33874 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 10243059018, 10243059034

LABORATORY CONTROL SAMPLE: 1603988

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	99	98-102	H6

SAMPLE DUPLICATE: 1603989

Parameter	Units	10240339042 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.5	6.5	.2	3	H6

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/17057 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10243059018, 10243059034

METHOD BLANK: 1604003 | Matrix: Water
Associated Lab Samples: 10243059018, 10243059034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/03/14 12:05	

LABORATORY CONTROL SAMPLE: 1604004

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604005 1604006

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.6	3.5	90	88	80-120	2	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1604007 1604008

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.4	2.5	2.5	3.8	3.8	97	93	80-120	3	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/16169 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009

METHOD BLANK: 1536562 — Matrix: Water
Associated Lab Samples: 10243059001, 10243059002, 10243059003, 10243059004, 10243059005, 10243059006, 10243059007, 10243059008, 10243059009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/27/13 13:11	

LABORATORY CONTROL SAMPLE: 1536563

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.2	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536564 — 1536565

Parameter	Units	10242377063 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	12.8	20	20	30.8	30.8	90	90	80-120	.1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536566 — 1536567

Parameter	Units	10242377073 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	21.3	20	20	39.7	37.4	92	81	80-120	6	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/16203 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243059010, 10243059011, 10243059012, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020, 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031

METHOD BLANK: 1540150 — Matrix: Water
Associated Lab Samples: 10243059010, 10243059011, 10243059012, 10243059015, 10243059016, 10243059017, 10243059018, 10243059019, 10243059020, 10243059021, 10243059022, 10243059023, 10243059024, 10243059025, 10243059026, 10243059027, 10243059028, 10243059029, 10243059030, 10243059031

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	10/01/13 11:30	

LABORATORY CONTROL SAMPLE: 1540151

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.9	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540152 — 1540153

Parameter	Units	10243059010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	20.0	19.5	98	96	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540154 — 1540155

Parameter	Units	10243059022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	7.9	20	20	26.4	26.8	92	94	80-120	2	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/16208 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059040, 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059056

METHOD BLANK: 1540251 — Matrix: Water
Associated Lab Samples: 10243059032, 10243059033, 10243059034, 10243059035, 10243059036, 10243059037, 10243059040, 10243059041, 10243059042, 10243059043, 10243059044, 10243059045, 10243059046, 10243059047, 10243059048, 10243059049, 10243059050, 10243059051, 10243059052, 10243059056

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	10/01/13 12:08	

LABORATORY CONTROL SAMPLE: 1540252

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	8.1	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540253 — 1540254

Parameter	Units	10243059032 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	8.2	20	20	27.8	27.9	98	99	80-120	.6	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540255 — 1540256

Parameter	Units	10243059044 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	6.4	20	20	29.7	29.5	116	115	80-120	.7	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/16210 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243059058, 10243059059, 10243059060, 10243059062, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059077, 10243059078, 10243059079, 10243059080, 10243059081

METHOD BLANK: 1540308 — Matrix: Water
Associated Lab Samples: 10243059058, 10243059059, 10243059060, 10243059062, 10243059065, 10243059066, 10243059067, 10243059068, 10243059069, 10243059070, 10243059071, 10243059072, 10243059073, 10243059074, 10243059075, 10243059077, 10243059078, 10243059079, 10243059080, 10243059081

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	10/01/13 12:38	

LABORATORY CONTROL SAMPLE: 1540309

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.0	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540310 — 1540311

Parameter	Units	10243059058 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	6.2	20	20	28.9	29.8	114	118	80-120	3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540312 — 1540313

Parameter	Units	10243059071 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	396	20	20	414	417	86	106	80-120	.9	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/16211 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

METHOD BLANK: 1540392 — Matrix: Water
Associated Lab Samples: 10243059082, 10243059083, 10243059084, 10243059085, 10243059086, 10243059087, 10243059088, 10243059089, 10243059090, 10243059091

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	10/01/13 13:43	

LABORATORY CONTROL SAMPLE: 1540393

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540394 — 1540395

Parameter	Units	10243059082 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	26.6	20	20	48.5	48.9	109	112	80-120	.9	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1540396 — 1540397

Parameter	Units	10242536001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	34.6	20	20	56.9	56.8	112	111	80-120	.2	30	

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/16228 — Analysis Method: ASTM D516
QC Batch Method: ASTM D516 — Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

METHOD BLANK: 1542182 — Matrix: Water
Associated Lab Samples: 10243059094, 10243059095, 10243059096, 10243059098, 10243059099, 10243059100, 10243059101, 10243059102

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	10/04/13 08:03	

LABORATORY CONTROL SAMPLE: 1542183

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.8	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1542184 — 1542185

Parameter	Units	10242536051 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	19.6	19.5	97	96	80-120	.5	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1542186 — 1542187

Parameter	Units	10243059094 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	16.0	20	20	33.3	31.6	87	78	80-120	5	30	M1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/17041 — Analysis Method: SM 4500-Cl E
QC Batch Method: SM 4500-Cl E — Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10243059018, 10243059034

METHOD BLANK: 1603873 — Matrix: Water
Associated Lab Samples: 10243059018, 10243059034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	01/02/14 14:18	

LABORATORY CONTROL SAMPLE: 1603874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.9	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603875 — 1603876

Parameter	Units	10237680008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	30	30	44.0	44.1	105	105	80-120	.3	30	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603877 — 1603878

Parameter	Units	10242377031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.9	30	30	39.2	39.5	111	112	80-120	.6	30	H1

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QUALITY CONTROL DATA

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

QC Batch: WETA/17023 | Analysis Method: SM 4500-NO2 B
QC Batch Method: SM 4500-NO2 B | Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 10243059018, 10243059034

METHOD BLANK: 1603178 | Matrix: Water
Associated Lab Samples: 10243059018, 10243059034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.10	12/31/13 14:48	

LABORATORY CONTROL SAMPLE: 1603179

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.3	0.30	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603180 1603181

Parameter	Units	10253697001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.18	0.18	61	61	80-120	.3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1603182 1603183

Parameter	Units	10242377019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrite as N	mg/L	ND	.3	.3	0.26	0.26	87	87	80-120	.6	30	H1

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QUALIFIERS

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
ES	The reported result is estimated because one or more of the constituent results are qualified as such.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059001	**SD0832-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059002	**SD0833-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059003	**SD0834-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059004	**SD0835-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059005	**SD0836-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059006	**SD0837-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059007	**SD0838-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059008	**SD0839-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059009	**SD0840-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059010	**SD0841-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059011	**SD0842-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059012	**SD0843-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059013	**SD0844-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059014	**SD0845-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059015	**SD0846-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059016	**SD0847-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059017	**SD0848-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059018	**SD0849-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059019	**SD0850-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059020	**SD0851-091713**	EPA 200.8	MPRP/42138	EPA 200.8	ICPM/17907
10243059021	**SD0852-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059022	**SD0853-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059023	**SD0854-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059024	**SD0855-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059025	**SD0856-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059026	**SD0857-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059027	**SD0858-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059028	**SD0859-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059029	**SD0860-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059030	**SD0861-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059031	**SD0862-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059032	**SD0863-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059033	**SD0864-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059034	**SD0865-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059035	**SD0866-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059036	**SD0867-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059037	**SD0868-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059038	**SD0869-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059039	**SD0870-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059040	**SD0871-091713**	EPA 200.8	MPRP/42140	EPA 200.8	ICPM/17902
10243059041	**SD0872-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059042	**SD0873-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059043	**SD0874-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059044	**SD0875-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059045	**SD0876-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059046	**SD0877-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059047	**SD0878-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059048	**SD0879-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059049	**SD0880-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059050	**SD0881-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059051	**SD0882-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059052	**SD0883-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059053	**SD0884-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059054	**SD0885-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059055	**SD0886-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059056	**SD0887-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059057	**SD0888-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059058	**SD0889-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059059	**SD0890-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059060	**SD0891-091713**	EPA 200.8	MPRP/42141	EPA 200.8	ICPM/17881
10243059061	**SD0892-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059062	**SD0893-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059063	**SD0894-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059064	**SD0895-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059065	**SD0896-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059066	**SD0897-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059067	**SD0898-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059068	**SD0899-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059069	**SD0900-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059070	**SD0901-091713**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059071	**SD0902-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059072	**SD0903-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059073	**SD0904-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059074	**SD0905-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059075	**SD0906-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059076	**SD0907-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059077	**SD0908-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059078	**SD0909-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059079	**SD0910-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059080	**SD0911-091813**	EPA 200.8	MPRP/42142	EPA 200.8	ICPM/17922
10243059081	**SD0912-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059082	**SD0925-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059083	**SD0926-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059084	**SD0927-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059085	**SD0928-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059086	**SD0929-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059087	**SD0930-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059088	**SD0931-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059089	**SD0932-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059090	**SD0933-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059091	**SD0924-091813**	EPA 200.8	MPRP/42143	EPA 200.8	ICPM/17900
10243059092	**SD0913-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059093	**SD0914-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059094	**SD0915-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059095	**SD0916-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059096	**SD0917-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059097	**SD0918-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059098	**SD0919-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059099	**SD0920-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059100	**SD0921-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059101	**SD0922-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059102	**SD0923-091813**	EPA 200.8	MPRP/42183	EPA 200.8	ICPM/17924
10243059001	**SD0832-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059002	**SD0833-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059003	**SD0834-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059004	**SD0835-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059005	**SD0836-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059006	**SD0837-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059007	**SD0838-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059008	**SD0839-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059009	**SD0840-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059010	**SD0841-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059011	**SD0842-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059012	**SD0843-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059013	**SD0844-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059014	**SD0845-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059015	**SD0846-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059016	**SD0847-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059017	**SD0848-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059018	**SD0849-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059019	**SD0850-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059020	**SD0851-091713**	EPA 200.8	MPRP/42133	EPA 200.8	ICPM/17908
10243059021	**SD0852-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059022	**SD0853-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059023	**SD0854-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059024	**SD0855-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059025	**SD0856-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059026	**SD0857-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059027	**SD0858-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059028	**SD0859-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059029	**SD0860-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059030	**SD0861-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059031	**SD0862-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059032	**SD0863-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059033	**SD0864-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059034	**SD0865-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059035	**SD0866-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059036	**SD0867-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059037	**SD0868-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059038	**SD0869-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059039	**SD0870-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910
10243059040	**SD0871-091713**	EPA 200.8	MPRP/42134	EPA 200.8	ICPM/17910

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059041	**SD0872-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059042	**SD0873-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059043	**SD0874-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059044	**SD0875-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059045	**SD0876-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059046	**SD0877-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059047	**SD0878-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059048	**SD0879-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059049	**SD0880-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059050	**SD0881-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059051	**SD0882-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059052	**SD0883-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059053	**SD0884-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059054	**SD0885-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059055	**SD0886-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059056	**SD0887-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059057	**SD0888-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059058	**SD0889-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059059	**SD0890-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059060	**SD0891-091713**	EPA 200.8	MPRP/42135	EPA 200.8	ICPM/17882
10243059061	**SD0892-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059062	**SD0893-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059063	**SD0894-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059064	**SD0895-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059065	**SD0896-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059066	**SD0897-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059067	**SD0898-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059068	**SD0899-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059069	**SD0900-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059070	**SD0901-091713**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059071	**SD0902-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059072	**SD0903-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059073	**SD0904-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059074	**SD0905-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059075	**SD0906-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059076	**SD0907-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059077	**SD0908-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059078	**SD0909-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059079	**SD0910-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059080	**SD0911-091813**	EPA 200.8	MPRP/42136	EPA 200.8	ICPM/17905
10243059081	**SD0912-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059082	**SD0925-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059083	**SD0926-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059084	**SD0927-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059085	**SD0928-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059086	**SD0929-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059087	**SD0930-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059088	**SD0931-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059089	**SD0932-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059090	**SD0933-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059091	**SD0924-091813**	EPA 200.8	MPRP/42137	EPA 200.8	ICPM/17911
10243059092	**SD0913-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059093	**SD0914-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059094	**SD0915-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059095	**SD0916-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059096	**SD0917-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059098	**SD0919-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059099	**SD0920-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059100	**SD0921-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059101	**SD0922-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059102	**SD0923-091813**	EPA 200.8	MPRP/42181	EPA 200.8	ICPM/17870
10243059001	**SD0832-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059002	**SD0833-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059003	**SD0834-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059004	**SD0835-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059005	**SD0836-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059006	**SD0837-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059007	**SD0838-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059008	**SD0839-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059009	**SD0840-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059010	**SD0841-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059011	**SD0842-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059012	**SD0843-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059013	**SD0844-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059014	**SD0845-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059015	**SD0846-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059016	**SD0847-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059017	**SD0848-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059018	**SD0849-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059019	**SD0850-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059020	**SD0851-091713**	EPA 245.1	MERP/9329	EPA 245.1	MERC/10753
10243059021	**SD0852-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059022	**SD0853-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059023	**SD0854-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059024	**SD0855-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059025	**SD0856-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059026	**SD0857-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059027	**SD0858-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059028	**SD0859-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059029	**SD0860-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059030	**SD0861-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059031	**SD0862-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059032	**SD0863-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059033	**SD0864-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059034	**SD0865-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059035	**SD0866-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059036	**SD0867-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059037	**SD0868-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059038	**SD0869-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059039	**SD0870-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059040	**SD0871-091713**	EPA 245.1	MERP/9330	EPA 245.1	MERC/10759
10243059041	**SD0872-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059042	**SD0873-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059043	**SD0874-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059044	**SD0875-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059045	**SD0876-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059046	**SD0877-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059047	**SD0878-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059048	**SD0879-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059049	**SD0880-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059050	**SD0881-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059051	**SD0882-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059052	**SD0883-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059053	**SD0884-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059054	**SD0885-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059055	**SD0886-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059056	**SD0887-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059057	**SD0888-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059058	**SD0889-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059059	**SD0890-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059060	**SD0891-091713**	EPA 245.1	MERP/9334	EPA 245.1	MERC/10756
10243059061	**SD0892-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059062	**SD0893-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059063	**SD0894-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059064	**SD0895-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059065	**SD0896-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059066	**SD0897-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059067	**SD0898-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059068	**SD0899-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059069	**SD0900-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059070	**SD0901-091713**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059071	**SD0902-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059072	**SD0903-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059073	**SD0904-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059074	**SD0905-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059075	**SD0906-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059076	**SD0907-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059077	**SD0908-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059078	**SD0909-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059079	**SD0910-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059080	**SD0911-091813**	EPA 245.1	MERP/9336	EPA 245.1	MERC/10758
10243059081	**SD0912-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059082	**SD0925-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059083	**SD0926-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059084	**SD0927-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059085	**SD0928-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059086	**SD0929-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059087	**SD0930-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059088	**SD0931-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059089	**SD0932-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059090	**SD0933-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059091	**SD0924-091813**	EPA 245.1	MERP/9342	EPA 245.1	MERC/10763
10243059092	**SD0913-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059093	**SD0914-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059094	**SD0915-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059095	**SD0916-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059096	**SD0917-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059097	**SD0918-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059098	**SD0919-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059099	**SD0920-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059100	**SD0921-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059101	**SD0922-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059102	**SD0923-091813**	EPA 245.1	MERP/9390	EPA 245.1	MERC/10773
10243059001	**SD0832-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059002	**SD0833-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059003	**SD0834-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059004	**SD0835-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059005	**SD0836-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059006	**SD0837-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059007	**SD0838-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059008	**SD0839-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059009	**SD0840-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059010	**SD0841-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059011	**SD0842-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059012	**SD0843-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059013	**SD0844-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059014	**SD0845-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059015	**SD0846-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059016	**SD0847-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059017	**SD0848-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059018	**SD0849-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059019	**SD0850-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059020	**SD0851-091713**	EPA 245.1	MERP/9331	EPA 245.1	MERC/10746
10243059021	**SD0852-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059022	**SD0853-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059023	**SD0854-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059024	**SD0855-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059025	**SD0856-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059026	**SD0857-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059027	**SD0858-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059028	**SD0859-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059029	**SD0860-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059030	**SD0861-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059031	**SD0862-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059032	**SD0863-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059033	**SD0864-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059034	**SD0865-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059035	**SD0866-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059036	**SD0867-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059037	**SD0868-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059038	**SD0869-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059039	**SD0870-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059040	**SD0871-091713**	EPA 245.1	MERP/9332	EPA 245.1	MERC/10745
10243059041	**SD0872-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059042	**SD0873-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059043	**SD0874-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059044	**SD0875-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059045	**SD0876-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059046	**SD0877-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059047	**SD0878-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059048	**SD0879-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059049	**SD0880-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059050	**SD0881-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059051	**SD0882-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059052	**SD0883-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059053	**SD0884-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059054	**SD0885-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059055	**SD0886-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059056	**SD0887-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059057	**SD0888-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059058	**SD0889-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059059	**SD0890-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059060	**SD0891-091713**	EPA 245.1	MERP/9333	EPA 245.1	MERC/10755
10243059061	**SD0892-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059062	**SD0893-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059063	**SD0894-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059064	**SD0895-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059065	**SD0896-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059066	**SD0897-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059067	**SD0898-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059068	**SD0899-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059069	**SD0900-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059070	**SD0901-091713**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059071	**SD0902-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059072	**SD0903-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059073	**SD0904-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059074	**SD0905-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059075	**SD0906-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059076	**SD0907-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059077	**SD0908-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059078	**SD0909-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059079	**SD0910-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059080	**SD0911-091813**	EPA 245.1	MERP/9335	EPA 245.1	MERC/10760
10243059081	**SD0912-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059082	**SD0925-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059083	**SD0926-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059084	**SD0927-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059085	**SD0928-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059086	**SD0929-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059087	**SD0930-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059088	**SD0931-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059089	**SD0932-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059090	**SD0933-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059091	**SD0924-091813**	EPA 245.1	MERP/9343	EPA 245.1	MERC/10762
10243059092	**SD0913-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059093	**SD0914-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059094	**SD0915-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059095	**SD0916-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059096	**SD0917-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059098	**SD0919-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059099	**SD0920-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059100	**SD0921-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059101	**SD0922-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059102	**SD0923-091813**	EPA 245.1	MERP/9381	EPA 245.1	MERC/10774
10243059018	**SD0849-091713**	SM 2320B	WET/33876		
10243059034	**SD0865-091713**	SM 2320B	WET/33876		
10243059001	**SD0832-091713**	SM 2540D	WET/32508		
10243059002	**SD0833-091713**	SM 2540D	WET/32508		
10243059003	**SD0834-091713**	SM 2540D	WET/32509		
10243059004	**SD0835-091713**	SM 2540D	WET/32509		
10243059005	**SD0836-091713**	SM 2540D	WET/32509		
10243059006	**SD0837-091713**	SM 2540D	WET/32509		
10243059007	**SD0838-091713**	SM 2540D	WET/32509		
10243059008	**SD0839-091713**	SM 2540D	WET/32509		
10243059009	**SD0840-091713**	SM 2540D	WET/32509		
10243059010	**SD0841-091713**	SM 2540D	WET/32509		
10243059011	**SD0842-091713**	SM 2540D	WET/32509		
10243059012	**SD0843-091713**	SM 2540D	WET/32509		
10243059015	**SD0846-091713**	SM 2540D	WET/32509		
10243059016	**SD0847-091713**	SM 2540D	WET/32509		
10243059017	**SD0848-091713**	SM 2540D	WET/32509		
10243059018	**SD0849-091713**	SM 2540D	WET/32509		
10243059019	**SD0850-091713**	SM 2540D	WET/32509		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059020	**SD0851-091713**	SM 2540D	WET/32509		
10243059021	**SD0852-091713**	SM 2540D	WET/32509		
10243059022	**SD0853-091713**	SM 2540D	WET/32509		
10243059023	**SD0854-091713**	SM 2540D	WET/32509		
10243059024	**SD0855-091713**	SM 2540D	WET/32509		
10243059025	**SD0856-091713**	SM 2540D	WET/32570		
10243059026	**SD0857-091713**	SM 2540D	WET/32570		
10243059027	**SD0858-091713**	SM 2540D	WET/32570		
10243059028	**SD0859-091713**	SM 2540D	WET/32570		
10243059029	**SD0860-091713**	SM 2540D	WET/32570		
10243059030	**SD0861-091713**	SM 2540D	WET/32570		
10243059031	**SD0862-091713**	SM 2540D	WET/32570		
10243059032	**SD0863-091713**	SM 2540D	WET/32570		
10243059033	**SD0864-091713**	SM 2540D	WET/32570		
10243059034	**SD0865-091713**	SM 2540D	WET/32570		
10243059035	**SD0866-091713**	SM 2540D	WET/32570		
10243059036	**SD0867-091713**	SM 2540D	WET/32570		
10243059037	**SD0868-091713**	SM 2540D	WET/32570		
10243059040	**SD0871-091713**	SM 2540D	WET/32570		
10243059041	**SD0872-091713**	SM 2540D	WET/32570		
10243059042	**SD0873-091713**	SM 2540D	WET/32570		
10243059043	**SD0874-091713**	SM 2540D	WET/32570		
10243059044	**SD0875-091713**	SM 2540D	WET/32570		
10243059045	**SD0876-091713**	SM 2540D	WET/32570		
10243059046	**SD0877-091713**	SM 2540D	WET/32570		
10243059047	**SD0878-091713**	SM 2540D	WET/32571		
10243059048	**SD0879-091713**	SM 2540D	WET/32571		
10243059049	**SD0880-091713**	SM 2540D	WET/32572		
10243059050	**SD0881-091713**	SM 2540D	WET/32572		
10243059051	**SD0882-091713**	SM 2540D	WET/32572		
10243059052	**SD0883-091713**	SM 2540D	WET/32572		
10243059056	**SD0887-091713**	SM 2540D	WET/32572		
10243059058	**SD0889-091713**	SM 2540D	WET/32572		
10243059059	**SD0890-091713**	SM 2540D	WET/32572		
10243059060	**SD0891-091713**	SM 2540D	WET/32572		
10243059062	**SD0893-091713**	SM 2540D	WET/32572		
10243059065	**SD0896-091713**	SM 2540D	WET/32572		
10243059066	**SD0897-091713**	SM 2540D	WET/32572		
10243059067	**SD0898-091713**	SM 2540D	WET/32572		
10243059068	**SD0899-091713**	SM 2540D	WET/32626		
10243059069	**SD0900-091713**	SM 2540D	WET/32626		
10243059070	**SD0901-091713**	SM 2540D	WET/32626		
10243059071	**SD0902-091813**	SM 2540D	WET/32626		
10243059072	**SD0903-091813**	SM 2540D	WET/32626		
10243059073	**SD0904-091813**	SM 2540D	WET/32626		
10243059074	**SD0905-091813**	SM 2540D	WET/32626		
10243059075	**SD0906-091813**	SM 2540D	WET/32626		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059077	**SD0908-091813**	SM 2540D	WET/32626		
10243059078	**SD0909-091813**	SM 2540D	WET/32626		
10243059079	**SD0910-091813**	SM 2540D	WET/32583		
10243059080	**SD0911-091813**	SM 2540D	WET/32583		
10243059081	**SD0912-091813**	SM 2540D	WET/32583		
10243059082	**SD0925-091813**	SM 2540D	WET/32583		
10243059083	**SD0926-091813**	SM 2540D	WET/32583		
10243059084	**SD0927-091813**	SM 2540D	WET/32583		
10243059085	**SD0928-091813**	SM 2540D	WET/32583		
10243059086	**SD0929-091813**	SM 2540D	WET/32583		
10243059087	**SD0930-091813**	SM 2540D	WET/32583		
10243059088	**SD0931-091813**	SM 2540D	WET/32583		
10243059089	**SD0932-091813**	SM 2540D	WET/32583		
10243059090	**SD0933-091813**	SM 2540D	WET/32583		
10243059091	**SD0924-091813**	SM 2540D	WET/32583		
10243059094	**SD0915-091813**	SM 2540D	WET/32584		
10243059095	**SD0916-091813**	SM 2540D	WET/32584		
10243059096	**SD0917-091813**	SM 2540D	WET/32584		
10243059098	**SD0919-091813**	SM 2540D	WET/32584		
10243059099	**SD0920-091813**	SM 2540D	WET/32584		
10243059100	**SD0921-091813**	SM 2540D	WET/32584		
10243059101	**SD0922-091813**	SM 2540D	WET/32584		
10243059102	**SD0923-091813**	SM 2540D	WET/32584		
10243059018	**SD0849-091713**	SM 4500-H+B	WET/33874		
10243059034	**SD0865-091713**	SM 4500-H+B	WET/33874		
10243059018	**SD0849-091713**	SM 4500-NO3 H	WETA/17057		
10243059034	**SD0865-091713**	SM 4500-NO3 H	WETA/17057		
10243059001	**SD0832-091713**	ASTM D516	WETA/16169		
10243059002	**SD0833-091713**	ASTM D516	WETA/16169		
10243059003	**SD0834-091713**	ASTM D516	WETA/16169		
10243059004	**SD0835-091713**	ASTM D516	WETA/16169		
10243059005	**SD0836-091713**	ASTM D516	WETA/16169		
10243059006	**SD0837-091713**	ASTM D516	WETA/16169		
10243059007	**SD0838-091713**	ASTM D516	WETA/16169		
10243059008	**SD0839-091713**	ASTM D516	WETA/16169		
10243059009	**SD0840-091713**	ASTM D516	WETA/16169		
10243059010	**SD0841-091713**	ASTM D516	WETA/16203		
10243059011	**SD0842-091713**	ASTM D516	WETA/16203		
10243059012	**SD0843-091713**	ASTM D516	WETA/16203		
10243059015	**SD0846-091713**	ASTM D516	WETA/16203		
10243059016	**SD0847-091713**	ASTM D516	WETA/16203		
10243059017	**SD0848-091713**	ASTM D516	WETA/16203		
10243059018	**SD0849-091713**	ASTM D516	WETA/16203		
10243059019	**SD0850-091713**	ASTM D516	WETA/16203		
10243059020	**SD0851-091713**	ASTM D516	WETA/16203		
10243059021	**SD0852-091713**	ASTM D516	WETA/16203		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059022	**SD0853-091713**	ASTM D516	WETA/16203		
10243059023	**SD0854-091713**	ASTM D516	WETA/16203		
10243059024	**SD0855-091713**	ASTM D516	WETA/16203		
10243059025	**SD0856-091713**	ASTM D516	WETA/16203		
10243059026	**SD0857-091713**	ASTM D516	WETA/16203		
10243059027	**SD0858-091713**	ASTM D516	WETA/16203		
10243059028	**SD0859-091713**	ASTM D516	WETA/16203		
10243059029	**SD0860-091713**	ASTM D516	WETA/16203		
10243059030	**SD0861-091713**	ASTM D516	WETA/16203		
10243059031	**SD0862-091713**	ASTM D516	WETA/16203		
10243059032	**SD0863-091713**	ASTM D516	WETA/16208		
10243059033	**SD0864-091713**	ASTM D516	WETA/16208		
10243059034	**SD0865-091713**	ASTM D516	WETA/16208		
10243059035	**SD0866-091713**	ASTM D516	WETA/16208		
10243059036	**SD0867-091713**	ASTM D516	WETA/16208		
10243059037	**SD0868-091713**	ASTM D516	WETA/16208		
10243059040	**SD0871-091713**	ASTM D516	WETA/16208		
10243059041	**SD0872-091713**	ASTM D516	WETA/16208		
10243059042	**SD0873-091713**	ASTM D516	WETA/16208		
10243059043	**SD0874-091713**	ASTM D516	WETA/16208		
10243059044	**SD0875-091713**	ASTM D516	WETA/16208		
10243059045	**SD0876-091713**	ASTM D516	WETA/16208		
10243059046	**SD0877-091713**	ASTM D516	WETA/16208		
10243059047	**SD0878-091713**	ASTM D516	WETA/16208		
10243059048	**SD0879-091713**	ASTM D516	WETA/16208		
10243059049	**SD0880-091713**	ASTM D516	WETA/16208		
10243059050	**SD0881-091713**	ASTM D516	WETA/16208		
10243059051	**SD0882-091713**	ASTM D516	WETA/16208		
10243059052	**SD0883-091713**	ASTM D516	WETA/16208		
10243059056	**SD0887-091713**	ASTM D516	WETA/16208		
10243059058	**SD0889-091713**	ASTM D516	WETA/16210		
10243059059	**SD0890-091713**	ASTM D516	WETA/16210		
10243059060	**SD0891-091713**	ASTM D516	WETA/16210		
10243059062	**SD0893-091713**	ASTM D516	WETA/16210		
10243059065	**SD0896-091713**	ASTM D516	WETA/16210		
10243059066	**SD0897-091713**	ASTM D516	WETA/16210		
10243059067	**SD0898-091713**	ASTM D516	WETA/16210		
10243059068	**SD0899-091713**	ASTM D516	WETA/16210		
10243059069	**SD0900-091713**	ASTM D516	WETA/16210		
10243059070	**SD0901-091713**	ASTM D516	WETA/16210		
10243059071	**SD0902-091813**	ASTM D516	WETA/16210		
10243059072	**SD0903-091813**	ASTM D516	WETA/16210		
10243059073	**SD0904-091813**	ASTM D516	WETA/16210		
10243059074	**SD0905-091813**	ASTM D516	WETA/16210		
10243059075	**SD0906-091813**	ASTM D516	WETA/16210		
10243059077	**SD0908-091813**	ASTM D516	WETA/16210		
10243059078	**SD0909-091813**	ASTM D516	WETA/16210		
10243059079	**SD0910-091813**	ASTM D516	WETA/16210		

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Butte Hill Diagnostic-Re
Pace Project No.: 10243059

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243059080	**SD0911-091813**	ASTM D516	WETA/16210		
10243059081	**SD0912-091813**	ASTM D516	WETA/16210		
10243059082	**SD0925-091813**	ASTM D516	WETA/16211		
10243059083	**SD0926-091813**	ASTM D516	WETA/16211		
10243059084	**SD0927-091813**	ASTM D516	WETA/16211		
10243059085	**SD0928-091813**	ASTM D516	WETA/16211		
10243059086	**SD0929-091813**	ASTM D516	WETA/16211		
10243059087	**SD0930-091813**	ASTM D516	WETA/16211		
10243059088	**SD0931-091813**	ASTM D516	WETA/16211		
10243059089	**SD0932-091813**	ASTM D516	WETA/16211		
10243059090	**SD0933-091813**	ASTM D516	WETA/16211		
10243059091	**SD0924-091813**	ASTM D516	WETA/16211		
10243059094	**SD0915-091813**	ASTM D516	WETA/16228		
10243059095	**SD0916-091813**	ASTM D516	WETA/16228		
10243059096	**SD0917-091813**	ASTM D516	WETA/16228		
10243059098	**SD0919-091813**	ASTM D516	WETA/16228		
10243059099	**SD0920-091813**	ASTM D516	WETA/16228		
10243059100	**SD0921-091813**	ASTM D516	WETA/16228		
10243059101	**SD0922-091813**	ASTM D516	WETA/16228		
10243059102	**SD0923-091813**	ASTM D516	WETA/16228		
10243059018	**SD0849-091713**	SM 4500-Cl E	WETA/17041		
10243059034	**SD0865-091713**	SM 4500-Cl E	WETA/17041		
10243059018	**SD0849-091713**	SM 4500-NO2 B	WETA/17023		
10243059034	**SD0865-091713**	SM 4500-NO2 B	WETA/17023		

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10243054

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number:

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision OOC-BU OOC-RM	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4							Comments
	SD0832-091713	9/20/2013	11:54		x			3	1		2				x	x	x							001
	SD0833-091713	9/20/2013	11:57		x			3	1		2				x	x	x							002
	SD0834-091713	9/20/2013	12:02		x			3	1		2				x	x	x							003
	SD0835-091713	9/20/2013	12:07		x			3	1		2				x	x	x							004
	SD0836-091713	9/20/2013	12:13		x			3	1		2				x	x	x							005
	SD0837-091713	9/20/2013	12:20		x			3	1		2				x	x	x							006
	SD0838-091713	9/20/2013	12:32		x			3	1		2				x	x	x							007
	SD0839-091713	9/20/2013	12:40		x			3	1		2				x	x	x							008
	SD0840-091713	9/20/2013	12:42		x			3	1		2				x	x	x							009
	SD0841-091713	9/20/2013	12:50		x			3	1		2				x	x	x							010

Sampler's Name:	Tina Donovan	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	TREC INC	Tina Donovan / TREC	9-23-13	1430	[illegible] / Pace	92413	0903
Shipment Method:	Fed Ex Ship Date: 9/23/2013						
Shipment Tracking No:	5753 4191 8305						

Special Instructions:

T= 2.8 4.2 2.9 3.9
3.6 5.1 4.8 3.2
0.0 3.1

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10243059

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0842-091713	9/20/2013	12:59		x			3	1		2				x	x	x								011
	SD0843-091713	9/20/2013	13:07		x			3	1		2				x	x	x								012
	SD0844-091713	9/20/2013	13:14		x			2	1		1				x	x									013
	SD0845-091713	9/20/2013	13:16		x			2	1		1				x	x									014
	SD0846-091713	9/20/2013	13:27		x			3	1		2				x	x	x								015
	SD0847-091713	9/20/2013	13:31		x			3	1		2				x	x	x								016
	SD0848-091713	9/20/2013	13:38		x			3	1		2				x	x	x								017
	SD0849-091713	9/20/2013	13:42		x			3	1		2				x	x	x								018
	SD0850-091713	9/20/2013	13:58		x			3	1		2				x	x	x								019
	SD0851-091713	9/20/2013	14:03		x			3	1		2				x	x	x								020

Sampler's Name: Tina Donovan			
Sampler's Company: TREC INC			
Shipment Method: Fed Ex	Ship Date: 9/23/2013		
Shipment Tracking No: 5753 4191 8305			

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Tina Donovan / TREC	9-23-13	1430	[illegible] pace	92413	0903

Special Instructions:

T= 2.8, 4.2, 2.9, 3.9, 3.0, 5.1, 4.8
3.2 3.1, 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10243059

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.	
Lab Address: 1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003	
Lab PM: Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715	
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney	
Lab Shipping Accnt: 1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364	Email: cdeeney@treccorp.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com	
Other Info:	Stage: Activity:	Invoice To: BP X Contractor	
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0852-091713	9/20/2013	14:15		x			3	1		2				x	x	x								021
	SD0853-091713	9/20/2013	14:18		x			3	1		2				x	x	x								022
	SD0854-091713	9/20/2013	14:24		x			3	1		2				x	x	x								023
	SD0855-091713	9/20/2013	14:31		x			3	1		2				x	x	x								024
	SD0856-091713	9/20/2013	14:40		x			3	1		2				x	x	x								025
	SD0857-091713	9/20/2013	14:46		x			3	1		2				x	x	x								026
	SD0858-091713	9/20/2013	14:49		x			3	1		2				x	x	x								027
	SD0859-091713	9/20/2013	14:55		x			3	1		2				x	x	x								028
	SD0860-091713	9/20/2013	15:00		x			3	1		2				x	x	x								029
	SD0861-091713	9/20/2013	15:12		x			3	1		2				x	x	x								030

Requested Analyses

Report Type & QC Level: Standard ____ Full Data Package ____

Sampler's Name: Tina Donovan	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: TREC INC	Tina Donovan / TREC	9-23-13	1430	[illegible]	9-24-13	0900
Shipment Method: Fed Ex Ship Date: 9/23/2013						
Shipment Tracking No: 5753 4191 8305						

Special Instructions:

TE 2.8 4.2 2.9 3.9 3.6 5.1

4.8 3.2 3.1 ND

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy):
Rush TAT: Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10243059

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		Requested Analyses: As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0862-091713	9/20/2013	15:15		x			3	1		2				x	x	x								031
	SD0863-091713	9/20/2013	15:19		x			3	1		2				x	x	x								032
	SD0864-091713	9/20/2013	15:22		x			3	1		2				x	x	x								033
	SD0865-091713	9/20/2013	15:29		x			3	1		2				x	x	x								034
	SD0866-091713	9/20/2013	15:52		x			3	1		2				x	x	x								035
	SD0867-091713	9/20/2013	15:57		x			3	1		2				x	x	x								036
	SD0868-091713	9/20/2013	16:01		x			3	1		2				x	x	x								037
	SD0869-091713	9/20/2013	16:08		x			2	1		1				x	x									038
	SD0870-091713	9/20/2013	16:15		x			2	1		1				x	x									039
	SD0871-091713	9/20/2013	16:21		x			3	1		2				x	x	x								040

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Tina Donovan								
Sampler's Company:	TREC INC			Tina Donovan / TREC	9-23-13	1430	[illegible]	9/24/13	0903
Shipment Method:	Fed Ex	Ship Date:	9/23/2013						
Shipment Tracking No:	5753 4191 8305								

Special Instructions:

T= 2.8 4.2 2.9 3.9
3.6 5.1 4.8 3.2

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy):
Lab Work Order Number:
Laboratory Work Order Number: 10243059

Rush TAT: Yes ____ No ____

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level
Standard ____
Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0872-091713	9/20/2013	16:28		x			3	1		2				x	x	x								041
	SD0873-091713	9/20/2013	16:39		x			3	1		2				x	x	x								042
	SD0874-091713	9/20/2013	16:51		x			3	1		2				x	x	x								043
	SD0875-091713	9/20/2013	16:55		x			3	1		2				x	x	x								044
	SD0876-091713	9/20/2013	17:00		x			3	1		2				x	x	x								045
	SD0877-091713	9/20/2013	17:07		x			3	1		2				x	x	x								046
	SD0878-091713	9/20/2013	17:09		x			3	1		2				x	x	x								047
	SD0879-091713	9/20/2013	17:11		x			3	1		2				x	x	x								048
	SD0880-091713	9/23/2013	9:36		x			3	1		2				x	x	x								049
	SD0881-091713	9/23/2013	9:43		x			3	1		2				x	x	x								050

Requested Analyses

Sampler's Name:	Tina Donovan						
Sampler's Company:	TREC INC						
Shipment Method:	Fed Ex	Ship Date:	9/23/2013				
Shipment Tracking No:	5753 4191 8305						

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[illegible] / TREC	9-23-13	1430	[illegible]	9/24/13	9:03

Special Instructions:

T= 2.6 4.2 2.9 3.9
3.6 5.1 4.8 3.2
3.1 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10243059

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level

Standard ____

Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0882-091713	9/23/2013	9:47		x			3	1		2				x	x	x								051
	SD0883-091713	9/23/2013	9:50		x			3	1		2				x	x	x								052
	SD0884-091713	9/23/2013	9:58		x			2	1		1				x	x									053
	SD0885-091713	9/23/2013	10:00		x			2	1		1				x	x									054
	SD0886-091713	9/23/2013	10:04		x			2	1		1				x	x									055
	SD0887-091713	9/23/2013	10:06		x			3	1		2				x	x	x								056
	SD0888-091713	9/23/2013	10:10		x			2	1		1				x	x									057
	SD0889-091713	9/23/2013	10:14		x			3	1		2				x	x	x								058
	SD0890-091713	9/23/2013	10:18		x			3	1		2				x	x	x								059
	SD0891-091713	9/23/2013	10:24		x			3	1		2				x	x	x								060

Sampler's Name:	Tina Donovan		
Sampler's Company:	TREC INC		
Shipment Method:	Fed Ex	Ship Date:	9/23/2013
Shipment Tracking No:	5753 4191 8305		

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Tina Donovan / TREC	9-23-13	1432	[illegible] / PNC	9/24/13	0907

Special Instructions:

F= 2.8 4.2 2.9 3.9
3.6 5.1 4.8 3.2
3.1 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy):
Lab Work Order Number:
Laboratory Work Order Number: 10243059

Rush TAT: Yes ____ No ____

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0892-091713	9/23/2013	10:39		x			2	1		1				x	x									061
	SD0893-091713	9/23/2013	10:42		x			3	1		2				x	x	x								062
	SD0894-091713	9/23/2013	10:46		x			2	1		1				x	x									063
	SD0895-091713	9/23/2013	10:49		x			2	1		1				x	x									064
	SD0896-091713	9/23/2013	10:54		x			3	1		2				x	x	x								065
	SD0897-091713	9/23/2013	10:58		x			3	1		2				x	x	x								066
	SD0898-091713	9/23/2013	11:01		x			3	1		2				x	x	x								067
	SD0899-091713	9/23/2013	11:04		x			3	1		2				x	x	x								068
	SD0900-091713	9/23/2013	11:07		x			3	1		2				x	x	x								069
	SD0901-091713	9/23/2013	11:11		x			3	1		2				x	x	x								070

Sampler's Name: Tina Donovan
Sampler's Company: TREC INC
Shipment Method: Fed Ex Ship Date: 9/23/2013
Shipment Tracking No: 5753 4191 8305

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[illegible] / TREC	9-23-13	1430	[illegible] / Pace	9/24/13	0903

Special Instructions:

T= 2.8 4.2 3.9 2.9 3.6 5.1
4.8 3.2 3.1 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10243059

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor
BP Project Mar Lindy Hanson			
BP PM Phone: 723-1838			
BP PM Email: lindy.hansont@bp.com			

Report Type & QC Level

Standard ____

Full Data Package ____

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T), Zn(T)	As(D), Cd(D), Cu(D), Pb(D), Hg(D), Zn(D)	TSS, SO_4								Comments
	SD0902-091813	9/23/2013	11:28		x			3	1		2				x	x	x								071
	SD0903-091813	9/23/2013	11:30		x			3	1		2				x	x	x								072
	SD0904-091813	9/23/2013	11:35		x			3	1		2				x	x	x								073
	SD0905-091813	9/23/2013	11:38		x			3	1		2				x	x	x								074
	SD0906-091813	9/23/2013	11:44		x			3	1		2				x	x	x								075
	SD0907-091813	9/23/2013	11:48		x			2	1		1				x	x									076
	SD0908-091813	9/23/2013	11:51		x			3	1		2				x	x	x								077
	SD0909-091813	9/23/2013	11:54		x			3	1		2				x	x	x								078
	SD0910-091813	9/23/2013	12:03		x			3	1		2				x	x	x								079
	SD0911-091813	9/23/2013	12:07		x			3	1		2				x	x	x								080

Sampler's Name:	Tina Donovan		
Sampler's Company:	TREC INC		
Shipment Method:	Fed Ex	Ship Date:	9/23/2013
Shipment Tracking No:	5753 4191 8305		

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / TREC	9-23-13	1430	[signature] / pace	9/24/13	0905

Special Instructions:

T= 2.8 4.2 2.9 3.9 3.6 5.1
4.8 3.2 3.1 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S

BP Facility No: BPSOU Butte Hill Diagnostic Monitoring

Activity:

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No ____

Lab Work Order Number:

Laboratory Work Order Number: 10243059

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4	Comments
	SD0912-091813	9/23/2013	12:10		x			3	1		2			x	x	x	041
	SD0913-091813	9/23/2013	12:13		x			2	1		1			x	x		042
	SD0914-091813	9/23/2013	12:15		x			2	1		1			x	x		043
	SD0915-091813	9/23/2013	12:24		x			3	1		2			x	x	x	044
	SD0916-091813	9/23/2013	12:30		x			3	1		2			x	x	x	045
	SD0917-091813	9/23/2013	12:34		x			3	1		2			x	x	x	046
	SD0918-091813	9/23/2013	12:36		x			1			1			x			047
	SD0919-091813	9/23/2013	12:42		x			3	1		2			x	x	x	048
	SD0920-091813	9/23/2013	12:46		x			3	1		2			x	x	x	049
	SD0921-091813	9/23/2013	12:49		x			3	1		2			x	x	x	100

		Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Tina Donovan						
Sampler's Company:	TREC INC	[signature] TREC	9-23-13	1430	[signature] pace	9/24/13	0903
Shipment Method:	Fed Ex Ship Date: 9/23/2013						
Shipment Tracking No:	5753 4191 8305						

Special Instructions:

T= 2.8 4.2 2.9 3.9 3.6 5.1 4.8
3.2 3.1 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No ____
Lab Work Order Number:
Laboratory Work Order Number: 10243059

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol		As(T), Cd(T), Cu(T), Pb(T), Hg(T), Zn(T)	As(D), Cd(D), Cu(D), Pb(D), Hg(D), Zn(D),	TSS, SO_4								Comments
	SD0922-091813	9/23/2013	12:51		x			3	1		2				x	x	x								081
	SD0923-091813	9/23/2013	12:55		x			3	1		2				x	x	x								082
	SD0924-091813	9/23/2013	12:57		x			3	1		2				x	x	x								091
	SD0925-091813	9/23/2013	13:02		x			3	1		2				x	x	x								092
	SD0926-091813	9/23/2013	13:05		x			3	1		2				x	x	x								083
	SD0927-091813	9/23/2013	13:08		x			3	1		2				x	x	x								084
	SD0928-091813	9/23/2013	13:11		x			3	1		2				x	x	x								085
	SD0929-091813	9/23/2013	13:14		x			3	1		2				x	x	x								086
	SD0930-091813	9/23/2013	13:18		x			3	1		2				x	x	x								087
	SD0931-091813	9/23/2013	13:21		x			3	1		2				x	x	x								088

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Tina Donovan			Tina Donovan / TREC	9-23-13	1400	[illegible]	9-24-13	0903
Sampler's Company:	TREC INC								
Shipment Method:	Fed Ex	Ship Date:	9/23/2013						
Shipment Tracking No:	5753 4191 8305								

Special Instructions:

T: 2.8 4.2 2.9 3.9 3.6
5.1 4.8 3.2 3.1 0.0

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP > USA > MT > SILVER BOW > Butte Priority S
BP Facility No: BPSOU Butte Hill Diagnostic Monitoring
Activity:

Req Due Date (mm/dd/yy):
Lab Work Order Number:
Laboratory Work Order Number: 10243059

Rush TAT: Yes ____ No ____

Lab Name:	Pace Analytical Services	Facility Address:	Consultant/Contractor: TREC, Inc.
Lab Address:	1700 Elm St SE, Minneapolis, MN 55414-2485	City, State, ZIP Code:	Consultant/Contractor Project No: 9208-003
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	Address: 1800 W. Koch, Suite 6 Bozeman MT 59715
Lab Phone:	612-607-1700	California Global ID No.:	Consultant/Contractor PM: Craig Deeney
Lab Shipping Accnt:	1797-5692-7	Enfos Proposal No:	Phone: 406-586-8364 Email: cdeeney@treccorp.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: SOUdata@treccorp.c and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP X Contractor

BP Project Mar Lindy Hanson
BP PM Phone: 723-1838
BP PM Email: lindy.hansont@bp.com

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	Requested Analyses: As(T), Cd(T), Cu(T), Pb(T), Hg(T),Zn(T)	As(D),Cd(D), Cu(D),Pb(D), Hg(D), Zn(D),	TSS, SO_4	Comments
	SD0932-091813	9/23/2013	13:24		x			3	1		2			x	x	x	089
	SD0933-091813	9/23/2013	13:26		x			3	1		2			x	x	x	090

				Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name:	Tina Donovan			[signature] TREC	9-23-13	1430	[signature] Pace	9-24-13	0903
Sampler's Company:	TREC INC								
Shipment Method:	Fed Ex	Ship Date:	9/23/2013						
Shipment Tracking No:	5753 4191 8305								

Special Instructions:

T= 2.8 4.2 2.9 3.9 3.6
5.1 4.8 3.2 3.1 0.0

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Trec

Project #: WO#: 10243059

10243059

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: on other sheet

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☑ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): on other sheet **Cooler Temp Corrected (°C):** on other sheet **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** on other sheet **Date and Initials of Person Examining Contents:** 92413

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12. missing BP3W's 913-923 missing unpres. 915-917, 919-924
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 2/2
Per method, VOA pH is checked after analysis				Initial when completed: ☆ Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Tina Donovan Date/Time: 9/24/13

Comments/Resolution: We are missing a cooler that was shipped. FedEx was contacted but the handle w/ tracking number fell off cooler.

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1100	Temp: on other sheet	Corrected Temp: on other sheet	
Time:	put in cooler	1120	
Time:	Temp:	Corrected Temp:	

Project Manager Review: [signature] **Date:** 9/24/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical®	Document Name: **SCUR Exceptions Form**	Document Revised: 16Apr2012 Page 1 of 1
	Document No.: **F-MN-L-220-Rev.00**	Issuing Authority: Pace Minnesota Quality Office

Workorder #: 10243059.

Issue	Sample ID		Container Type/#	
5753 4191 8452	#1	2.9	-0.1	2.8
5753 4191 8419	#1	4.3	-0.1	4.2
5753 4191 8420	#4	3.1	-0.2	2.9
5753 4191 8463	#1	4.0	-0.1	3.9
5753 4191 8496	#4	3.8	-0.2	3.6
5753 4191 8430	#4	5.3	-0.2	5.1
5753 4191 8441	#4	5.0	-0.2	4.8
5753 4191 8408	#4	3.4	-0.2	3.2
5753 4191 8485	#4	3.3	-0.2	3.1
*missing 5753 4191 8474				
7967 5665 1862	#1	0.1 ~~0.0~~	-0.1	0.0

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Trec

Project #:

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 7947 5665 1062

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ 88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.1 **Cooler Temp Corrected (°C):** 0.0 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** -.1 **Date and Initials of Person Examining Contents:** 9-25-13/

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-5 2/2; 6 1/1; 7-11 2/2
Per method, VOA pH is checked after analysis				Initial when completed: NT Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution: *missing cooler from 9/24

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1315	Temp: 0.0	Corrected Temp:
Time: 1335	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 9/26/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical®	Document Name: **SCUR Exceptions Form**	Document Revised: 16Apr2012 Page 1 of 1
	Document No.: **F-MN-L-220-Rev.00**	Issuing Authority: Pace Minnesota Quality Office

Workorder #: 10243059

Issue	Sample ID	Container Type/#
Received on 9/25	SDO 0913	BP3N(2)
"	" 0914	"
"	" 0915	" BP1U (1)
"	0916	" BP2U(1)
"	0917	" BP2U(1)
"	0918	BP3N (1)
"	0919	BP3N (2) BP2U(1)
"	0920	" BP1U(1)
"	0921	" BP1U(1)
"	0922	" BP1U(1)
"	0923	" BP1U(1)
"	0924	BP1U(1)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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December 27, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 24, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 12/27/13 to add addition elements per the clients request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 5 #WD-15J
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10243168001	**LAO-BS-01-092313**	Water	09/23/13 13:40	09/24/13 09:03
10243168002	**LAO-BS-02-092313**	Water	09/23/13 13:42	09/24/13 09:03
10243168003	**LAO-BS-03-092313**	Water	09/23/13 13:44	09/24/13 09:03
10243168004	**LAO-BS-04-092313**	Water	09/23/13 13:46	09/24/13 09:03
10243168005	**LAO-BS-05-092313**	Water	09/23/13 13:48	09/24/13 09:03
10243168006	**LAO-BS-06-092313**	Water	09/23/13 13:50	09/24/13 09:03
10243168007	**LAO-BS-07-092313**	Water	09/23/13 13:52	09/24/13 09:03
10243168008	**LAO-BS-09-092313**	Water	09/23/13 13:56	09/24/13 09:03
10243168009	**LAO-BS-08-092313**	Water	09/23/13 13:54	09/24/13 09:03
10243168010	**LAO-BS-10-092313**	Water	09/23/13 13:58	09/24/13 09:03
10243168011	**LAO-BS-11-092313**	Water	09/23/13 14:00	09/24/13 09:03
10243168012	**LAO-BS-12-092313**	Water	09/23/13 14:02	09/24/13 09:03
10243168013	**LAO-BS-13-092313**	Water	09/23/13 14:04	09/24/13 09:03
10243168014	**LAO-BS-14-092313**	Water	09/23/13 14:06	09/24/13 09:03

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10243168001	**LAO-BS-01-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168002	**LAO-BS-02-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168003	**LAO-BS-03-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168004	**LAO-BS-04-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168005	**LAO-BS-05-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168006	**LAO-BS-06-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168007	**LAO-BS-07-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168008	**LAO-BS-09-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168009	**LAO-BS-08-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168010	**LAO-BS-10-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168011	**LAO-BS-11-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168012	**LAO-BS-12-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168013	**LAO-BS-13-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243168014	**LAO-BS-14-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 27, 2013

General Information:
14 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/42145

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243168001,10243168011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1535112)
  - Calcium
  - Silver
  - Sodium
- MS (Lab ID: 1535114)
  - Calcium
  - Magnesium
  - Silver
  - Sodium
- MSD (Lab ID: 1535113)
  - Calcium
  - Magnesium
  - Silver
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 27, 2013

Additional Comments:

Analyte Comments:

QC Batch: MPRP/42145

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1535112)
  - Calcium
  - Sodium
- MS (Lab ID: 1535114)
  - Calcium
  - Sodium
- MSD (Lab ID: 1535113)
  - Calcium
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 27, 2013

General Information:
14 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9351

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243168002,10243169006

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1534476)
  - Mercury
- MSD (Lab ID: 1534477)
  - Mercury

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-01-092313 **Lab ID: 10243168001** Collected: 09/23/13 13:40 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0073**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 17:56	7429-90-5	
Arsenic	**0.0025**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 17:56	7440-38-2	
Cadmium	**0.00060**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 17:56	7440-43-9	
Calcium	**102**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 16:27	7440-70-2	M1
Copper	**0.011**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 17:56	7440-50-8	
Iron	**0.026J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 17:56	7439-89-6	
Lead	**0.00017**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 17:56	7439-92-1	
Magnesium	**25.2**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 16:27	7439-95-4	M1
Manganese	**0.15**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 17:56	7439-96-5	
Potassium	**8.2**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 17:56	7440-09-7	
Silica	**19.1**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 16:27	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 17:56	7440-22-4	M1
Sodium	**47.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 16:27	7440-23-5	M1
Total Hardness by 2340B	**359**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 16:27		
Uranium-238	**0.0017**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 17:56	7440-61-1	
Zinc	**0.072**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 17:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 17:59	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-02-092313 **Lab ID: 10243168002** Collected: 09/23/13 13:42 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0056**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:01	7429-90-5	
Arsenic	**0.0024**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:01	7440-38-2	
Cadmium	**0.00048**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:01	7440-43-9	
Calcium	**101**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 15:44	7440-70-2	
Copper	**0.0094**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:01	7440-50-8	
Iron	**0.020J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:01	7439-89-6	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:01	7439-92-1	
Magnesium	**24.9**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 15:44	7439-95-4	
Manganese	**0.15**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:01	7439-96-5	
Potassium	**8.3**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:01	7440-09-7	
Silica	**18.9**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 15:44	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:01	7440-22-4	
Sodium	**47.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 15:44	7440-23-5	
Total Hardness by 2340B	**355**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 15:44		
Uranium-238	**0.00099**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:01	7440-61-1	
Zinc	**0.055**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:01	7439-97-6	M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-03-092313 **Lab ID: 10243168003** Collected: 09/23/13 13:44 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.080**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:06	7429-90-5	
Arsenic	**0.0024**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:06	7440-38-2	
Cadmium	**0.00043**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:06	7440-43-9	
Calcium	**97.4**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 16:16	7440-70-2	
Copper	**0.010**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:06	7440-50-8	
Iron	**0.019J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:06	7439-89-6	
Lead	**0.00043**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:06	7439-92-1	
Magnesium	**23.7**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 16:16	7439-95-4	
Manganese	**0.14**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:06	7439-96-5	
Potassium	**8.0**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:06	7440-09-7	
Silica	**18.2**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 16:16	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:06	7440-22-4	
Sodium	**45.7**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 16:16	7440-23-5	
Total Hardness by 2340B	**340**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 16:16		
Uranium-238	**0.00086**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:06	7440-61-1	
Zinc	**0.058**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:06	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:11	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-04-092313 **Lab ID: 10243168004** Collected: 09/23/13 13:46 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.28**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:11	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:11	7440-38-2	
Cadmium	**0.00064**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:11	7440-43-9	
Calcium	**98.8**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 16:37	7440-70-2	
Copper	**0.0096**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:11	7440-50-8	
Iron	**0.042J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:11	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:11	7439-92-1	
Magnesium	**24.3**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 16:37	7439-95-4	
Manganese	**0.17**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:11	7439-96-5	
Potassium	**8.0**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:11	7440-09-7	
Silica	**18.3**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 16:37	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:11	7440-22-4	
Sodium	**46.5**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 16:37	7440-23-5	
Total Hardness by 2340B	**347**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 16:37		
Uranium-238	**0.0010**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:11	7440-61-1	
Zinc	**0.087**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:11	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:13	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-05-092313 **Lab ID: 10243168005** Collected: 09/23/13 13:48 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.012**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:16	7429-90-5	
Arsenic	**0.0025**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:16	7440-38-2	
Cadmium	**0.00048**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:16	7440-43-9	
Calcium	**100**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 16:48	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:16	7440-50-8	
Iron	**0.027J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:16	7439-89-6	
Lead	**0.00057**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:16	7439-92-1	
Magnesium	**24.9**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 16:48	7439-95-4	
Manganese	**0.14**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:16	7439-96-5	
Potassium	**8.3**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:16	7440-09-7	
Silica	**18.0**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 16:48	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:16	7440-22-4	
Sodium	**47.6**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 16:48	7440-23-5	
Total Hardness by 2340B	**353**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 16:48		
Uranium-238	**0.00078**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:16	7440-61-1	
Zinc	**0.057**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:15	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-06-092313 **Lab ID: 10243168006** Collected: 09/23/13 13:50 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0056**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:21	7429-90-5	
Arsenic	**0.0021**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:21	7440-38-2	
Cadmium	**0.00065**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:21	7440-43-9	
Calcium	**100**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 17:15	7440-70-2	
Copper	**0.011**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:21	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:21	7439-89-6	
Lead	**0.00017**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:21	7439-92-1	
Magnesium	**25.4**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 17:15	7439-95-4	
Manganese	**0.18**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:21	7439-96-5	
Potassium	**8.4**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:21	7440-09-7	
Silica	**18.4**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 17:15	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:21	7440-22-4	
Sodium	**47.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 17:15	7440-23-5	
Total Hardness by 2340B	**355**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 17:15		
Uranium-238	**0.0010**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:21	7440-61-1	
Zinc	**0.076**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:18	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-07-092313 **Lab ID: 10243168007** Collected: 09/23/13 13:52 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0047**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:26	7429-90-5	
Arsenic	**0.0021**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:26	7440-38-2	
Cadmium	**0.00064**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:26	7440-43-9	
Calcium	**108**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 17:26	7440-70-2	
Copper	**0.0091**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:26	7440-50-8	
Iron	**0.023J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:26	7439-89-6	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:26	7439-92-1	
Magnesium	**26.9**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 17:26	7439-95-4	
Manganese	**0.28**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:26	7439-96-5	
Potassium	**8.7**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:26	7440-09-7	
Silica	**20.0**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 17:26	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:26	7440-22-4	
Sodium	**52.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 17:26	7440-23-5	
Total Hardness by 2340B	**381**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 17:26		
Uranium-238	**0.0013**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:26	7440-61-1	
Zinc	**0.081**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:20	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-09-092313 **Lab ID: 10243168008** Collected: 09/23/13 13:56 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0046**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 18:59	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 18:59	7440-38-2	
Cadmium	**0.00061**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 18:59	7440-43-9	
Calcium	**106**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 17:36	7440-70-2	
Copper	**0.0091**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 18:59	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 18:59	7439-89-6	
Lead	**0.000097J**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 18:59	7439-92-1	
Magnesium	**26.6**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 17:36	7439-95-4	
Manganese	**0.26**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 18:59	7439-96-5	
Potassium	**8.5**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 18:59	7440-09-7	
Silica	**19.4**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 17:36	7631-86-9	
Silver	**0.000084J**	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 18:59	7440-22-4	
Sodium	**53.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 17:36	7440-23-5	
Total Hardness by 2340B	**376**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 17:36		
Uranium-238	**0.0012**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 18:59	7440-61-1	
Zinc	**0.077**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 18:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:22	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-08-092313 **Lab ID: 10243168009** Collected: 09/23/13 13:54 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0047**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 19:05	7429-90-5	
Arsenic	**0.0024**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 19:05	7440-38-2	
Cadmium	**0.00053**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 19:05	7440-43-9	
Calcium	**106**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 17:47	7440-70-2	
Copper	**0.0092**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 19:05	7440-50-8	
Iron	**0.020J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 19:05	7439-89-6	
Lead	**0.00012**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 19:05	7439-92-1	
Magnesium	**26.1**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 17:47	7439-95-4	
Manganese	**0.20**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 19:05	7439-96-5	
Potassium	**8.6**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 19:05	7440-09-7	
Silica	**19.2**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 17:47	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 19:05	7440-22-4	
Sodium	**54.4**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 17:47	7440-23-5	
Total Hardness by 2340B	**373**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 17:47		
Uranium-238	**0.00094**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 19:05	7440-61-1	
Zinc	**0.067**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 19:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:24	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-10-092313 **Lab ID: 10243168010** Collected: 09/23/13 13:58 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0041**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 19:10	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 19:10	7440-38-2	
Cadmium	**0.00063**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 19:10	7440-43-9	
Calcium	**108**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 17:57	7440-70-2	
Copper	**0.0099**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 19:10	7440-50-8	
Iron	**0.020J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 19:10	7439-89-6	
Lead	**0.000075J**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 19:10	7439-92-1	
Magnesium	**27.1**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 17:57	7439-95-4	
Manganese	**0.24**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 19:10	7439-96-5	
Potassium	**8.7**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 19:10	7440-09-7	
Silica	**19.7**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 17:57	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 19:10	7440-22-4	
Sodium	**54.0**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 17:57	7440-23-5	
Total Hardness by 2340B	**382**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 17:57		
Uranium-238	**0.0011**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 19:10	7440-61-1	
Zinc	**0.083**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 19:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:30	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-11-092313 **Lab ID: 10243168011** Collected: 09/23/13 14:00 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0051**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 19:15	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 19:15	7440-38-2	
Cadmium	**0.00052**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 19:15	7440-43-9	
Calcium	**110**	mg/L	0.20	0.098	10	10/05/13 07:04	10/10/13 19:20	7440-70-2	M1
Copper	**0.0092**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 19:15	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 19:15	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 19:15	7439-92-1	
Magnesium	**29.0**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 18:24	7439-95-4	M1
Manganese	**0.27**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 19:15	7439-96-5	
Potassium	**8.9**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 19:15	7440-09-7	
Silica	**20.8**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 18:24	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 19:15	7440-22-4	M1
Sodium	**58.5**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 18:24	7440-23-5	M1
Total Hardness by 2340B	**393**	mg/L	0.71	0.36	10	10/05/13 07:04	10/10/13 19:20		
Uranium-238	**0.0011**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 19:15	7440-61-1	
Zinc	**0.086**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 19:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:32	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-12-092313 **Lab ID: 10243168012** Collected: 09/23/13 14:02 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0037J**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 19:25	7429-90-5	
Arsenic	**0.0021**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 19:25	7440-38-2	
Cadmium	**0.00058**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 19:25	7440-43-9	
Calcium	**110**	mg/L	0.20	0.098	10	10/05/13 07:04	10/10/13 19:30	7440-70-2	
Copper	**0.0098**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 19:25	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 19:25	7439-89-6	
Lead	**0.000068J**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 19:25	7439-92-1	
Magnesium	**28.9**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 18:35	7439-95-4	
Manganese	**0.34**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 19:25	7439-96-5	
Potassium	**8.9**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 19:25	7440-09-7	
Silica	**21.1**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 18:35	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 19:25	7440-22-4	
Sodium	**59.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 18:35	7440-23-5	
Total Hardness by 2340B	**395**	mg/L	0.71	0.36	10	10/05/13 07:04	10/10/13 19:30		
Uranium-238	**0.0012**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 19:25	7440-61-1	
Zinc	**0.10**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 19:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:34	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-13-092313 **Lab ID: 10243168013** Collected: 09/23/13 14:04 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.015**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 19:35	7429-90-5	
Arsenic	**0.00014J**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 19:35	7440-38-2	
Cadmium	**0.000034J**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 19:35	7440-43-9	
Calcium	**38.5**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 18:45	7440-70-2	
Copper	**0.0017**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 19:35	7440-50-8	
Iron	**0.0061J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 19:35	7439-89-6	
Lead	**0.000070J**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 19:35	7439-92-1	
Magnesium	**0.47**	mg/L	0.0050	0.0024	1	10/05/13 07:04	10/10/13 19:35	7439-95-4	
Manganese	**0.0063**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 19:35	7439-96-5	
Potassium	**1.0**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 19:35	7440-09-7	
Silica	**4.0**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 18:45	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 19:35	7440-22-4	
Sodium	**6.3**	mg/L	0.050	0.010	1	10/05/13 07:04	10/10/13 19:35	7440-23-5	
Total Hardness by 2340B	**98.0**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 18:45		
Uranium-238	ND	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 19:35	7440-61-1	
Zinc	**0.0080**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 19:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:36	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Sample: LAO-BS-14-092313 **Lab ID: 10243168014** Collected: 09/23/13 14:06 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.018**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 19:40	7429-90-5	
Arsenic	**0.00022J**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 19:40	7440-38-2	
Cadmium	**0.000090**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 19:40	7440-43-9	
Calcium	**40.8**	mg/L	0.10	0.049	5	10/05/13 07:04	10/08/13 18:56	7440-70-2	
Copper	**0.0028**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 19:40	7440-50-8	
Iron	**0.028J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 19:40	7439-89-6	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 19:40	7439-92-1	
Magnesium	**0.56**	mg/L	0.0050	0.0024	1	10/05/13 07:04	10/10/13 19:40	7439-95-4	
Manganese	**0.020**	mg/L	0.00050	0.00018	1	10/05/13 07:04	10/10/13 19:40	7439-96-5	
Potassium	**1.0**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 19:40	7440-09-7	
Silica	**4.3**	mg/L	0.27	0.13	5	10/05/13 07:04	10/08/13 18:56	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 19:40	7440-22-4	
Sodium	**6.5**	mg/L	0.050	0.010	1	10/05/13 07:04	10/10/13 19:40	7440-23-5	
Total Hardness by 2340B	**104**	mg/L	0.36	0.18	5	10/05/13 07:04	10/08/13 18:56		
Uranium-238	ND	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 19:40	7440-61-1	
Zinc	**0.023**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 19:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:38	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

QC Batch: MERP/9351 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243168001, 10243168002, 10243168003, 10243168004, 10243168005, 10243168006, 10243168007, 10243168008, 10243168009, 10243168010, 10243168011, 10243168012, 10243168013, 10243168014

METHOD BLANK: 1534474 — Matrix: Water
Associated Lab Samples: 10243168001, 10243168002, 10243168003, 10243168004, 10243168005, 10243168006, 10243168007, 10243168008, 10243168009, 10243168010, 10243168011, 10243168012, 10243168013, 10243168014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/06/13 17:51	

LABORATORY CONTROL SAMPLE: 1534475

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534476 — 1534477

Parameter	Units	10243168002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0058	0.0060	117	119	85-115	2	20	M1

MATRIX SPIKE SAMPLE: 1534478

Parameter	Units	10243169006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000070J	.005	0.0055	109	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

QC Batch: MPRP/42145 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10243168001, 10243168002, 10243168003, 10243168004, 10243168005, 10243168006, 10243168007, 10243168008, 10243168009, 10243168010, 10243168011, 10243168012, 10243168013, 10243168014

METHOD BLANK: 1535110 — Matrix: Water
Associated Lab Samples: 10243168001, 10243168002, 10243168003, 10243168004, 10243168005, 10243168006, 10243168007, 10243168008, 10243168009, 10243168010, 10243168011, 10243168012, 10243168013, 10243168014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	10/08/13 16:06	
Arsenic	mg/L	ND	0.00050	10/08/13 16:06	
Cadmium	mg/L	ND	0.000080	10/08/13 16:06	
Calcium	mg/L	ND	0.020	10/08/13 16:06	
Copper	mg/L	ND	0.00050	10/08/13 16:06	
Iron	mg/L	ND	0.050	10/08/13 16:06	
Lead	mg/L	ND	0.00010	10/08/13 16:06	
Magnesium	mg/L	ND	0.0050	10/08/13 16:06	
Manganese	mg/L	ND	0.00050	10/08/13 16:06	
Potassium	mg/L	ND	0.020	10/08/13 16:06	
Silver	mg/L	ND	0.00050	10/08/13 16:06	
Sodium	mg/L	ND	0.050	10/08/13 16:06	
Uranium-238	mg/L	ND	0.00050	10/10/13 17:51	
Zinc	mg/L	ND	0.0050	10/08/13 16:06	

LABORATORY CONTROL SAMPLE: 1535111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.082	103	85-115	
Arsenic	mg/L	.08	0.080	101	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	1.0	104	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.080	100	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Manganese	mg/L	.08	0.079	98	85-115	
Potassium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.080	100	85-115	
Sodium	mg/L	1	1.0	102	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535112 — 1535113

Parameter	Units	10243168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0073	.08	.08	0.092	0.088	105	101	70-130	4	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535112 1535113

Parameter	Units	10243168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.0025	.08	.08	0.089	0.086	108	105	70-130	3	20	
Cadmium	mg/L	0.00060	.08	.08	0.084	0.082	104	102	70-130	3	20	
Calcium	mg/L	102	1	1	101	95.6	-157	-665	70-130	5	20	E,M1
Copper	mg/L	0.011	.08	.08	0.096	0.092	106	102	70-130	4	20	
Iron	mg/L	0.026J	1	1	1.0	1.0	100	98	70-130	2	20	
Lead	mg/L	0.00017	.08	.08	0.079	0.078	99	98	70-130	2	20	
Magnesium	mg/L	25.2	1	1	26.1	25.0	88	-20	70-130	4	20	M1
Manganese	mg/L	0.15	.08	.08	0.23	0.22	105	92	70-130	4	20	
Potassium	mg/L	8.2	1	1	9.4	8.9	120	68	70-130	6	20	
Silver	mg/L	ND	.08	.08	0.031	0.029	38	36	70-130	5	20	M1
Sodium	mg/L	47.2	1	1	49.9	47.5	266	32	70-130	5	20	E,M1
Uranium-238	mg/L	0.0017	.08	.08	0.085	0.083	105	101	70-130	3	20	
Zinc	mg/L	0.072	.08	.08	0.15	0.15	103	97	70-130	3	20	

MATRIX SPIKE SAMPLE: 1535114

Parameter	Units	10243168011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.0051	.08	0.082	96	70-130	
Arsenic	mg/L	0.0022	.08	0.087	106	70-130	
Cadmium	mg/L	0.00052	.08	0.081	101	70-130	
Calcium	mg/L	110	1	110	8	70-130	E,M1
Copper	mg/L	0.0092	.08	0.091	102	70-130	
Iron	mg/L	0.021J	1	1.0	99	70-130	
Lead	mg/L	ND	.08	0.078	98	70-130	
Magnesium	mg/L	29.0	1	28.8	-29	70-130	M1
Manganese	mg/L	0.27	.08	0.35	94	70-130	
Potassium	mg/L	8.9	1	9.8	89	70-130	
Silver	mg/L	ND	.08	0.025	31	70-130	M1
Sodium	mg/L	58.5	1	55.2	-328	70-130	E,M1
Uranium-238	mg/L	0.0011	.08	0.083	102	70-130	
Zinc	mg/L	0.086	.08	0.16	96	70-130	

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QUALIFIERS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10243168

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243168001	**LAO-BS-01-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168002	**LAO-BS-02-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168003	**LAO-BS-03-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168004	**LAO-BS-04-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168005	**LAO-BS-05-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168006	**LAO-BS-06-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168007	**LAO-BS-07-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168008	**LAO-BS-09-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168009	**LAO-BS-08-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168010	**LAO-BS-10-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168011	**LAO-BS-11-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168012	**LAO-BS-12-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168013	**LAO-BS-13-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168014	**LAO-BS-14-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243168001	**LAO-BS-01-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168002	**LAO-BS-02-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168003	**LAO-BS-03-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168004	**LAO-BS-04-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168005	**LAO-BS-05-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168006	**LAO-BS-06-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168007	**LAO-BS-07-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168008	**LAO-BS-09-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168009	**LAO-BS-08-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168010	**LAO-BS-10-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168011	**LAO-BS-11-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168012	**LAO-BS-12-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168013	**LAO-BS-13-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243168014	**LAO-BS-14-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

207743

Page 1 of 2

BP Site Node Path: BP_USA_MT_Silver Bow_Butte Priority Soils Req Due Date (mm/dd/yy): 10/7/13 Rush TAT: Yes ___ No X

BP Facility No: LAO Wetlands (Bench Scale) Lab Work Order Number: 10243168

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MT DEQ	Address: 1101 S. Montana St. Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-techni
Lab Bottle Order No:	Accounting Mode: Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP X Contractor ___

BP Project Manager (PM): Lindy Hanson

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard ___ Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Metals	Comments
	LAO-BS-01-092313	9/23/13	1340		X			1			X			X	10243168001
	LAO-BS-02-092313	9/23/13	1342		X			1			X			X	002
	LAO-BS-03-092313	9/23/13	1344		X			1			X			X	003
	LAO-BS-04-092313	9/23/13	1346		X			1			X			X	004
	LAO-BS-05-092313	9/23/13	1348		X			1			X			X	005
	LAO-BS-06-092313	9/23/13	1350		X			1			X			X	006
	LAO-BS-07-092313	9/23/13	1352		X			1			X			X	007
	~~LAO-BS-08-092313~~	~~9/23/13~~	~~1354~~								X				
	LAO-BS-09-092313	9/23/13	1356		X			1			X			X	008
	LAO-BS-08-092313	9/23/13	~~1358~~ 1354		X			1			X			X	009

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] /PTS	9/23/13	1500	[signature] / PACE	9/24/13	903

Sampler's Name: Thomas Hickey

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 9/23/13

Shipment Tracking No:

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (Yes circled) | Temp Blank: Yes / No (Yes circled) | Cooler Temp on Receipt: 25 °F/C | Trip Blank: Yes / No (No circled) | MS/MSD Sample Submitted: Yes / No (No circled)

bp rm

Laboratory Management Program LaMP Chain of Custody Record 207742

BP Site Node Path: BP_USA_MT_SlurBrin_Butte Priority Soils
BP Facility No: LAO Wetlands (Bench Scale)
Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No X
Lab Work Order Number: 10243168

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 1101 S. Montana, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: Dave.Griffis@Pioneer-Technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP X Contractor ____

BP Project Manager (PM): Lindy Hanson
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard ____ Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Metals	Comments
	LAO-BS-10-092313	9/23/13	1358		X			1			X			X	10243168010
	LAO-BS-11-092313		1400		X			1			X			X	011
	LAO-BS-12-092313		1402		X			1			X			X	012
	LAO-BS-13-092313		1404		X			1			X			X	013
	LAO-BS-14-092313		1406		X			1			X			X	014

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey						
Sampler's Company: Pioneer Technical Services	[signature] /PTS	9/23/13	1500	[signature] PTS	9/24/13	0903
Shipment Method: Fed Ex Ship Date: 9/23/13						
Shipment Tracking No: 5540 9197 7162						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (O) | Temp Blank: Yes / No (O) | Cooler Temp on Receipt: 2.5 °F/C | Trip Blank: Yes / No (O) | MS/MSD Sample Submitted: Yes / No (O)

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer

Project #: WO# : 10243168

10243168

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9197 7162

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.6 **Cooler Temp Corrected (°C):** 2.5 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** -.1 **Date and Initials of Person Examining Contents:** 9-24-13 [illegible]

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☒ No	☐ N/A	11. JT 9/25/13
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # H14 41
Per method, VOA pH is checked after analysis				Initial when completed: [illegible] Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log. Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1620	Temp: 3.1 2.5	Corrected Temp:
Time: 1640	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: [signature] **Date:** 9/25/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 24, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 1/15/14 to add additional metals, SO4, Chloride and pH per the clients request to sample 003.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10243169001	**LAO-SS-1-091913**	Water	09/19/13 14:30	09/24/13 09:03
10243169002	**LAO-SS-1-092313**	Water	09/23/13 11:43	09/24/13 09:03
10243169003	**LAO-SS-2-092313**	Water	09/23/13 10:55	09/24/13 09:03
10243169004	**LAO-SS-3-092313**	Water	09/23/13 11:10	09/24/13 09:03
10243169005	**LAO-SS-4-092313**	Water	09/23/13 11:51	09/24/13 09:03
10243169006	**LAO-SS-2T-092313**	Water	09/23/13 10:55	09/24/13 09:03

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10243169001	**LAO-SS-1-091913**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10243169002	**LAO-SS-1-092313**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	HNKH	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10243169003	**LAO-SS-2-092313**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	HNKH	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-H+B	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
		ASTM D516	KEO	1	PASI-M
		SM 4500-Cl E	KEO	1	PASI-M
10243169004	**LAO-SS-3-092313**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	HNKH	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10243169005	**LAO-SS-4-092313**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	HNKH	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10243169006	**LAO-SS-2T-092313**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	HNKH	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/42145

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243168001,10243168011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1535112)
  - Calcium
  - Silver
  - Sodium
- MS (Lab ID: 1535114)
  - Calcium
  - Magnesium
  - Silver
  - Sodium
- MSD (Lab ID: 1535113)
  - Calcium
  - Magnesium
  - Silver
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 28, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/42145

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1535112)
  - Calcium
  - Sodium
- MS (Lab ID: 1535114)
  - Calcium
  - Sodium
- MSD (Lab ID: 1535113)
  - Calcium
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/9351

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243168002,10243169006

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1534476)
  - Mercury
- MSD (Lab ID: 1534477)
  - Mercury

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: WET/32647

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1543572)
  - Alkalinity, Total as CaCO3

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/32647

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243598003,10243783002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1543578)
  - Alkalinity, Total as CaCO3

Additional Comments:

Analyte Comments:

QC Batch: WET/32647

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1543572)
  - Alkalinity, Total as CaCO3

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- LAO-SS-1-092313 (Lab ID: 10243169002)
- LAO-SS-2-092313 (Lab ID: 10243169003)
- LAO-SS-2T-092313 (Lab ID: 10243169006)
- LAO-SS-3-092313 (Lab ID: 10243169004)
- LAO-SS-4-092313 (Lab ID: 10243169005)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- LAO-SS-1-092313 (Lab ID: 10243169002)
- LAO-SS-2-092313 (Lab ID: 10243169003)
- LAO-SS-2T-092313 (Lab ID: 10243169006)
- LAO-SS-3-092313 (Lab ID: 10243169004)
- LAO-SS-4-092313 (Lab ID: 10243169005)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/32583

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
- DUP (Lab ID: 1539936)
  - Total Suspended Solids

Additional Comments:

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Minneapolis, MN 55414
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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA recommended holding time.
- LAO-SS-2-092313 (Lab ID: 10243169003)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16120

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242536011,10243169002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1534118)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1534119)
  - Nitrogen, NO2 plus NO3

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **ASTM D516**
Description: ASTM D516 Sulfate Water
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
1 sample was analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- LAO-SS-2-092313 (Lab ID: 10243169003)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16928

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10252384001,10252862002

M6: Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
- MS (Lab ID: 1597986)
  - Sulfate
- MSD (Lab ID: 1597987)
  - Sulfate

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Method: **SM 4500-Cl E**
Description: SM4500Cl-E Chloride
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
1 sample was analyzed for SM 4500-Cl E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H1: Analysis conducted outside the recognized method holding time.
- LAO-SS-2-092313 (Lab ID: 10243169003)

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16950

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10252104005,10252862002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 1599314)
  - Chloride
- MS (Lab ID: 1599316)
  - Chloride
- MSD (Lab ID: 1599315)
  - Chloride
- MSD (Lab ID: 1599317)
  - Chloride

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Sample: LAO-SS-1-091913 **Lab ID: 10243169001** Collected: 09/19/13 14:30 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.11**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 20:08	7429-90-5	
Arsenic	**0.016**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 20:08	7440-38-2	
Cadmium	**0.00030**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 20:08	7440-43-9	
Calcium	**110**	mg/L	0.20	0.098	10	10/05/13 07:04	10/10/13 20:13	7440-70-2	
Copper	**0.035**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 20:08	7440-50-8	
Iron	**0.22**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 20:08	7439-89-6	
Lead	**0.0042**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 20:08	7439-92-1	
Magnesium	**26.0**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 19:06	7439-95-4	
Silver	**0.000098J**	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 20:08	7440-22-4	
Total Hardness by 2340B	**382**	mg/L	0.71	0.36	10	10/05/13 07:04	10/10/13 20:13		
Uranium-238	**0.0021**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 20:08	7440-61-1	
Zinc	**0.088**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 20:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:40	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Sample: LAO-SS-1-092313 **Lab ID: 10243169002** Collected: 09/23/13 11:43 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.17**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 20:18	7429-90-5	
Arsenic	**0.011**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 20:18	7440-38-2	
Cadmium	**0.00044**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 20:18	7440-43-9	
Calcium	**114**	mg/L	0.20	0.098	10	10/05/13 07:04	10/10/13 20:23	7440-70-2	
Copper	**0.032**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 20:18	7440-50-8	
Iron	**0.26**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 20:18	7439-89-6	
Lead	**0.0041**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 20:18	7439-92-1	
Magnesium	**24.7**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 19:34	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 20:18	7440-22-4	
Total Hardness by 2340B	**386**	mg/L	0.71	0.36	10	10/05/13 07:04	10/10/13 20:23		
Uranium-238	**0.0015**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 20:18	7440-61-1	
Zinc	**0.11**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 20:18	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:46	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**28.1**	mg/L	5.0	2.5	1		10/07/13 15:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**701**	mg/L	10.0	5.0	1		10/01/13 08:43		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**10.3**	mg/L	10.0	5.0	1		10/01/13 12:01		H1
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.63**	mg/L	0.10	0.050	1		10/04/13 12:35		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Sample: LAO-SS-2-092313 **Lab ID: 10243169003** Collected: 09/23/13 10:55 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.77**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 20:28	7429-90-5	
Arsenic	**0.11**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 20:28	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 20:28	7440-43-9	
Calcium	**122**	mg/L	0.40	0.20	20	10/05/13 07:04	10/10/13 20:33	7440-70-2	
Copper	**1.3**	mg/L	0.0025	0.00087	5	10/05/13 07:04	10/08/13 19:44	7440-50-8	
Iron	**8.1**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 20:28	7439-89-6	
Lead	**0.019**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 20:28	7439-92-1	
Magnesium	**31.2**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 19:44	7439-95-4	
Manganese	**4.8**	mg/L	0.010	0.0037	20	10/05/13 07:04	10/10/13 20:33	7439-96-5	
Potassium	**8.7**	mg/L	0.020	0.0047	1	10/05/13 07:04	10/10/13 20:28	7440-09-7	
Silica	**34.3**	mg/L	1.1	0.54	20	10/05/13 07:04	10/10/13 20:33	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 20:28	7440-22-4	
Sodium	**55.2**	mg/L	0.25	0.051	5	10/05/13 07:04	10/08/13 19:44	7440-23-5	
Total Hardness by 2340B	**434**	mg/L	1.4	0.71	20	10/05/13 07:04	10/10/13 20:33		
Uranium-238	**0.013**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 20:28	7440-61-1	
Zinc	**6.1**	mg/L	0.10	0.020	20	10/05/13 07:04	10/10/13 20:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00016J**	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:49	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**95.2**	mg/L	5.0	2.5	1		10/04/13 13:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**764**	mg/L	10.0	5.0	1		10/01/13 08:44		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**14.5**	mg/L	10.0	5.0	1		10/01/13 12:01		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.050	1		01/03/14 10:04		H6
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		10/04/13 12:39		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516								
Sulfate	**369**	mg/L	62.5	31.2	25		12/19/13 14:45	14808-79-8	H1
SM4500Cl-E Chloride	Analytical Method: SM 4500-Cl E								
Chloride	**55.6**	mg/L	2.0	1.0	1		12/20/13 15:21	16887-00-6	H1

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Sample: LAO-SS-3-092313 **Lab ID: 10243169004** Collected: 09/23/13 11:10 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.30**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 20:38	7429-90-5	
Arsenic	**0.0036**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 20:38	7440-38-2	
Cadmium	**0.032**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 20:38	7440-43-9	
Calcium	**129**	mg/L	0.40	0.20	20	10/05/13 07:04	10/10/13 20:43	7440-70-2	
Copper	**1.6**	mg/L	0.0025	0.00087	5	10/05/13 07:04	10/08/13 19:55	7440-50-8	
Iron	**9.6**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 20:38	7439-89-6	
Lead	**0.0013**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 20:38	7439-92-1	
Magnesium	**35.4**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 19:55	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 20:38	7440-22-4	
Total Hardness by 2340B	**469**	mg/L	1.4	0.71	20	10/05/13 07:04	10/10/13 20:43		
Uranium-238	**0.012**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 20:38	7440-61-1	
Zinc	**7.0**	mg/L	0.10	0.020	20	10/05/13 07:04	10/10/13 20:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:51	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**67.0**	mg/L	5.0	2.5	1		10/04/13 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**877**	mg/L	10.0	5.0	1		10/01/13 08:45		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**18.6**	mg/L	10.0	5.0	1		10/01/13 12:01		H1
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.4**	mg/L	0.10	0.050	1		10/04/13 12:40		

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Sample: LAO-SS-4-092313 **Lab ID: 10243169005** Collected: 09/23/13 11:51 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0040J**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 21:15	7429-90-5	
Arsenic	**0.00014J**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 21:15	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 21:15	7440-43-9	
Calcium	**0.034**	mg/L	0.020	0.0098	1	10/05/13 07:04	10/10/13 21:15	7440-70-2	
Copper	**0.0018**	mg/L	0.00050	0.00017	1	10/05/13 07:04	10/10/13 21:15	7440-50-8	
Iron	**0.0060J**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 21:15	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 21:15	7439-92-1	
Magnesium	**0.0055**	mg/L	0.0050	0.0024	1	10/05/13 07:04	10/10/13 21:15	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 21:15	7440-22-4	
Total Hardness by 2340B	**0.11**	mg/L	0.071	0.036	1	10/05/13 07:04	10/10/13 21:15		
Uranium-238	ND	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 21:15	7440-61-1	
Zinc	**0.0027J**	mg/L	0.0050	0.00098	1	10/05/13 07:04	10/10/13 21:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:53	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		10/07/13 15:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**13.0**	mg/L	10.0	5.0	1		10/01/13 08:45		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		10/01/13 12:01		H1
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		10/04/13 14:31		

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Sample: LAO-SS-2T-092313 **Lab ID: 10243169006** Collected: 09/23/13 10:55 Received: 09/24/13 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.40**	mg/L	0.0040	0.0015	1	10/05/13 07:04	10/10/13 20:48	7429-90-5	
Arsenic	**0.069**	mg/L	0.00050	0.000093	1	10/05/13 07:04	10/10/13 20:48	7440-38-2	
Cadmium	**0.024**	mg/L	0.000080	0.000032	1	10/05/13 07:04	10/10/13 20:48	7440-43-9	
Calcium	**122**	mg/L	0.40	0.20	20	10/05/13 07:04	10/10/13 20:53	7440-70-2	
Copper	**0.96**	mg/L	0.0025	0.00087	5	10/05/13 07:04	10/08/13 20:15	7440-50-8	
Iron	**5.4**	mg/L	0.050	0.0059	1	10/05/13 07:04	10/10/13 20:48	7439-89-6	
Lead	**0.0099**	mg/L	0.00010	0.000046	1	10/05/13 07:04	10/10/13 20:48	7439-92-1	
Magnesium	**31.3**	mg/L	0.025	0.012	5	10/05/13 07:04	10/08/13 20:15	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	10/05/13 07:04	10/10/13 20:48	7440-22-4	
Total Hardness by 2340B	**435**	mg/L	1.4	0.71	20	10/05/13 07:04	10/10/13 20:53		
Uranium-238	**0.012**	mg/L	0.00050	0.00010	1	10/05/13 07:04	10/10/13 20:48	7440-61-1	
Zinc	**6.0**	mg/L	0.10	0.020	20	10/05/13 07:04	10/10/13 20:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000070J**	mg/L	0.00020	0.000030	1	10/05/13 10:24	10/06/13 18:55	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**99.7**	mg/L	5.0	2.5	1		10/04/13 14:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**794**	mg/L	10.0	5.0	1		10/01/13 08:45		H1
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**7.7J**	mg/L	10.0	5.0	1		10/01/13 12:01		H1
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.3**	mg/L	0.10	0.050	1		10/04/13 12:44		

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: MERP/9351 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10243169001, 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

METHOD BLANK: 1534474 | Matrix: Water
Associated Lab Samples: 10243169001, 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/06/13 17:51	

LABORATORY CONTROL SAMPLE: 1534475

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534476 1534477

Parameter	Units	10243168002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0058	0.0060	117	119	85-115	2	20	M1

MATRIX SPIKE SAMPLE: 1534478

Parameter	Units	10243169006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000070J	.005	0.0055	109	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: MPRP/42145 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10243169001, 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

METHOD BLANK: 1535110 Matrix: Water
Associated Lab Samples: 10243169001, 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	10/08/13 16:06	
Arsenic	mg/L	ND	0.00050	10/08/13 16:06	
Cadmium	mg/L	ND	0.000080	10/08/13 16:06	
Calcium	mg/L	ND	0.020	10/08/13 16:06	
Copper	mg/L	ND	0.00050	10/08/13 16:06	
Iron	mg/L	ND	0.050	10/08/13 16:06	
Lead	mg/L	ND	0.00010	10/08/13 16:06	
Magnesium	mg/L	ND	0.0050	10/08/13 16:06	
Manganese	mg/L	ND	0.00050	10/08/13 16:06	
Potassium	mg/L	ND	0.020	10/08/13 16:06	
Silver	mg/L	ND	0.00050	10/08/13 16:06	
Sodium	mg/L	ND	0.050	10/08/13 16:06	
Uranium-238	mg/L	ND	0.00050	10/10/13 17:51	
Zinc	mg/L	ND	0.0050	10/08/13 16:06	

LABORATORY CONTROL SAMPLE: 1535111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.082	103	85-115	
Arsenic	mg/L	.08	0.080	101	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	1.0	104	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.080	100	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Manganese	mg/L	.08	0.079	98	85-115	
Potassium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.080	100	85-115	
Sodium	mg/L	1	1.0	102	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535112 1535113

Parameter	Units	10243168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0073	.08	.08	0.092	0.088	105	101	70-130	4	20	
Arsenic	mg/L	0.0025	.08	.08	0.089	0.086	108	105	70-130	3	20	
Cadmium	mg/L	0.00060	.08	.08	0.084	0.082	104	102	70-130	3	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1535112 1535113

Parameter	Units	10243168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	102	1	1	101	95.6	-157	-665	70-130	5	20	E,M1
Copper	mg/L	0.011	.08	.08	0.096	0.092	106	102	70-130	4	20	
Iron	mg/L	0.026J	1	1	1.0	1.0	100	98	70-130	2	20	
Lead	mg/L	0.00017	.08	.08	0.079	0.078	99	98	70-130	2	20	
Magnesium	mg/L	25.2	1	1	26.1	25.0	88	-20	70-130	4	20	M1
Manganese	mg/L	0.15	.08	.08	0.23	0.22	105	92	70-130	4	20	
Potassium	mg/L	8.2	1	1	9.4	8.9	120	68	70-130	6	20	
Silver	mg/L	ND	.08	.08	0.031	0.029	38	36	70-130	5	20	M1
Sodium	mg/L	47.2	1	1	49.9	47.5	266	32	70-130	5	20	E,M1
Uranium-238	mg/L	0.0017	.08	.08	0.085	0.083	105	101	70-130	3	20	
Zinc	mg/L	0.072	.08	.08	0.15	0.15	103	97	70-130	3	20	

MATRIX SPIKE SAMPLE: 1535114

Parameter	Units	10243168011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.0051	.08	0.082	96	70-130	
Arsenic	mg/L	0.0022	.08	0.087	106	70-130	
Cadmium	mg/L	0.00052	.08	0.081	101	70-130	
Calcium	mg/L	110	1	110	8	70-130	E,M1
Copper	mg/L	0.0092	.08	0.091	102	70-130	
Iron	mg/L	0.021J	1	1.0	99	70-130	
Lead	mg/L	ND	.08	0.078	98	70-130	
Magnesium	mg/L	29.0	1	28.8	-29	70-130	M1
Manganese	mg/L	0.27	.08	0.35	94	70-130	
Potassium	mg/L	8.9	1	9.8	89	70-130	
Silver	mg/L	ND	.08	0.025	31	70-130	M1
Sodium	mg/L	58.5	1	55.2	-328	70-130	E,M1
Uranium-238	mg/L	0.0011	.08	0.083	102	70-130	
Zinc	mg/L	0.086	.08	0.16	96	70-130	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WET/32647 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10243169003, 10243169004, 10243169006

METHOD BLANK: 1543572 — Matrix: Water
Associated Lab Samples: 10243169003, 10243169004, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	6.3	5.0	10/04/13 12:58	P8

LABORATORY CONTROL SAMPLE & LCSD: 1543573 1543574

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.8	40.8	102	102	90-110	.02	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1543575 1543576

Parameter	Units	10243783002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	249	40	40	295	288	114	97	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1543577 1543578

Parameter	Units	10243598003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	374	40	40	417	405	107	78	80-120	3	30	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WET/32690 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10243169002, 10243169005

METHOD BLANK: 1545068 | Matrix: Water
Associated Lab Samples: 10243169002, 10243169005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	10/07/13 12:09	

LABORATORY CONTROL SAMPLE & LCSD: 1545069 1545070

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.7	40.5	102	101	90-110	.6	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1545071 1545072

Parameter	Units	10243787001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	15.9	40	40	54.3	55.2	96	98	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1545073 1545074

Parameter	Units	10243169002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	28.1	40	40	63.1	62.6	88	86	80-120	.7	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WET/32580 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

METHOD BLANK: 1539901 Matrix: Water
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10/01/13 08:37	

LABORATORY CONTROL SAMPLE: 1539902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	876	88	80-120	

SAMPLE DUPLICATE: 1539904

Parameter	Units	10243598005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2250	2250	.04	10	H1

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WET/32583 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

METHOD BLANK: 1539933 Matrix: Water
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/01/13 12:00	

METHOD BLANK: 1539937 Matrix: Water
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/01/13 12:01	

LABORATORY CONTROL SAMPLE: 1539934

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	98.8	99	80-120	

SAMPLE DUPLICATE: 1539935

Parameter	Units	10243059079 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	395	433	9	10	H1

SAMPLE DUPLICATE: 1539936

Parameter	Units	10243335002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.9J	12.8		10	D8,H1

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WET/33874
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 10243169003

LABORATORY CONTROL SAMPLE: 1603988

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	99	98-102	H6

SAMPLE DUPLICATE: 1603989

Parameter	Units	10240339042 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.5	6.5	.2	3	H6

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WETA/16120 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

METHOD BLANK: 1534116 | Matrix: Water
Associated Lab Samples: 10243169002, 10243169003, 10243169004, 10243169005, 10243169006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	10/04/13 14:30	

LABORATORY CONTROL SAMPLE: 1534117

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534118 1534119

Parameter	Units	10243169002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.63	2.5	2.5	1.4	1.3	31	28	80-120	5	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534120 1534121

Parameter	Units	10242536011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.2	2.5	2.5	3.7	3.6	100	98	80-120	1	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WETA/16928
QC Batch Method: ASTM D516
Analysis Method: ASTM D516
Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10243169003

METHOD BLANK: 1597982
Matrix: Water
Associated Lab Samples: 10243169003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	12/19/13 13:04	

LABORATORY CONTROL SAMPLE: 1597983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1597984 1597985

Parameter	Units	10252862002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	30.0	20	20	47.6	47.5	88	88	80-120	.2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1597986 1597987

Parameter	Units	10252384001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1820	20	20	1790	1660	-172	-815	80-120	7	30	M6

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

QC Batch: WETA/16950
QC Batch Method: SM 4500-Cl E
Analysis Method: SM 4500-Cl E
Analysis Description: SM4500Cl-E Chloride
Associated Lab Samples: 10243169003

METHOD BLANK: 1599312
Matrix: Water
Associated Lab Samples: 10243169003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	2.0	12/20/13 15:47	

LABORATORY CONTROL SAMPLE: 1599313

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	30	31.3	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1599314 1599315

Parameter	Units	10252104005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	156	30	30	179	179	78	78	80-120	.1	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1599316 1599317

Parameter	Units	10252862002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	72.0	30	30	95.1	95.2	77	77	80-120	.1	30	M1

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QUALIFIERS

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands-Revised
Pace Project No.: 10243169

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10243169001	**LAO-SS-1-091913**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243169002	**LAO-SS-1-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243169003	**LAO-SS-2-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243169004	**LAO-SS-3-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243169005	**LAO-SS-4-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243169006	**LAO-SS-2T-092313**	EPA 200.8	MPRP/42145	EPA 200.8	ICPM/17920
10243169001	**LAO-SS-1-091913**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243169002	**LAO-SS-1-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243169003	**LAO-SS-2-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243169004	**LAO-SS-3-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243169005	**LAO-SS-4-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243169006	**LAO-SS-2T-092313**	EPA 245.1	MERP/9351	EPA 245.1	MERC/10754
10243169002	**LAO-SS-1-092313**	SM 2320B	WET/32690		
10243169003	**LAO-SS-2-092313**	SM 2320B	WET/32647		
10243169004	**LAO-SS-3-092313**	SM 2320B	WET/32647		
10243169005	**LAO-SS-4-092313**	SM 2320B	WET/32690		
10243169006	**LAO-SS-2T-092313**	SM 2320B	WET/32647		
10243169002	**LAO-SS-1-092313**	SM 2540C	WET/32580		
10243169003	**LAO-SS-2-092313**	SM 2540C	WET/32580		
10243169004	**LAO-SS-3-092313**	SM 2540C	WET/32580		
10243169005	**LAO-SS-4-092313**	SM 2540C	WET/32580		
10243169006	**LAO-SS-2T-092313**	SM 2540C	WET/32580		
10243169002	**LAO-SS-1-092313**	SM 2540D	WET/32583		
10243169003	**LAO-SS-2-092313**	SM 2540D	WET/32583		
10243169004	**LAO-SS-3-092313**	SM 2540D	WET/32583		
10243169005	**LAO-SS-4-092313**	SM 2540D	WET/32583		
10243169006	**LAO-SS-2T-092313**	SM 2540D	WET/32583		
10243169003	**LAO-SS-2-092313**	SM 4500-H+B	WET/33874		
10243169002	**LAO-SS-1-092313**	SM 4500-NO3 H	WETA/16120		
10243169003	**LAO-SS-2-092313**	SM 4500-NO3 H	WETA/16120		
10243169004	**LAO-SS-3-092313**	SM 4500-NO3 H	WETA/16120		
10243169005	**LAO-SS-4-092313**	SM 4500-NO3 H	WETA/16120		
10243169006	**LAO-SS-2T-092313**	SM 4500-NO3 H	WETA/16120		
10243169003	**LAO-SS-2-092313**	ASTM D516	WETA/16928		
10243169003	**LAO-SS-2-092313**	SM 4500-Cl E	WETA/16950		

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Laboratory Management Program LaMP Chain of Custody Record

1151
1154

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Monthly) **Lab Work Order Number:** 10243169

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate+Nitrite	TDS/TSS/Alkalinity					Comments
	LAO-SS-1-091913	9/19/13	14:30		X			2	1	1	2				X	X	X	X						10243169001
	LAO-SS-1-092313	9/23/13	11:43		X			4	1	1	2				X	X	X	X	X	X				002
	~~LAO-SS-1T~~				X			3	1	1	1				X	X	X		X	X				
	LAO-SS-2-092313	9/23/13	10:55		X			3	1	1	1				X	X	X		X	X				003
	LAO-SS-3-092313	9/23/13	11:10		X			3	1	1	1				X	X	X		X	X				004
	LAO-SS-4-092313	9/23/13	11:51		X			3	1	1	1				X	X	X		X	X				005
	LAO-SS-2T-092313	9/23/13	10:55		X			3	1	1	1				X	X	X		X	X				006

Sampler's Name: Tom Hockey + CJ Kissell

Sampler's Company: Pioneer Technical Services

Shipment Method: FED EX Ship Date: 9/23/13

Shipment Tracking No: 5540 9197 7162

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
CJ Kissell / PTS	9/23/13	1500	Jul / PACE	9/24/13	903

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt - ESI Tech Specs

Client Name: Power

Project #: WO#: 10243169

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5390 9197 7162

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.6 **Cooler Temp Corrected (°C):** 2.5 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** -.1 **Date and Initials of Person Examining Contents:** 9-24-13 /WT

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1
Per method, VOA pH is checked after analysis				Initial when completed: WT Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1620	Temp: 2.5	Corrected Temp:
Time: 1640	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 9/25/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

December 30, 2013

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on October 01, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 12/30/13 to add addition elements per the clients request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer

julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 5 #WD-15J
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10244062001	**LAO-BS-01-092613**	Water	09/30/13 02:45	10/01/13 08:58
10244062002	**LAO-BS-02-092613**	Water	09/30/13 02:46	10/01/13 08:58
10244062003	**LAO-BS-03-092613**	Water	09/30/13 02:47	10/01/13 08:58
10244062004	**LAO-BS-04-092613**	Water	09/30/13 02:48	10/01/13 08:58
10244062005	**LAO-BS-05-092613**	Water	09/30/13 02:49	10/01/13 08:58
10244062006	**LAO-BS-06-092613**	Water	09/30/13 02:50	10/01/13 08:58
10244062007	**LAO-BS-07-092613**	Water	09/30/13 02:51	10/01/13 08:58
10244062008	**LAO-BS-08-092613**	Water	09/30/13 02:52	10/01/13 08:58
10244062009	**LAO-BS-09-092613**	Water	09/30/13 02:52	10/01/13 08:58
10244062010	**LAO-BS-10-092613**	Water	09/30/13 02:53	10/01/13 08:58
10244062011	**LAO-BS-11-092613**	Water	09/30/13 02:54	10/01/13 08:58
10244062012	**LAO-BS-12-092613**	Water	09/30/13 02:55	10/01/13 08:58
10244062013	**LAO-BS-13-092613**	Water	09/30/13 02:58	10/01/13 08:58
10244062014	**LAO-BS-14-092613**	Water	09/30/13 03:00	10/01/13 08:58

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10244062001	**LAO-BS-01-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062002	**LAO-BS-02-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062003	**LAO-BS-03-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062004	**LAO-BS-04-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062005	**LAO-BS-05-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062006	**LAO-BS-06-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062007	**LAO-BS-07-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062008	**LAO-BS-08-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062009	**LAO-BS-09-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062010	**LAO-BS-10-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062011	**LAO-BS-11-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062012	**LAO-BS-12-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062013	**LAO-BS-13-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
10244062014	**LAO-BS-14-092613**	EPA 200.8	RB1	16	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

General Information:
14 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/42366

B: Analyte was detected in the associated method blank.

- BLANK for HBN 271222 [MPRP/423 (Lab ID: 1542560)
  - Aluminum
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/42366

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10244060003,10244062009

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1555000)
  - Aluminum
  - Calcium
  - Magnesium
  - Manganese
  - Silver
  - Sodium
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 30, 2013

QC Batch: MPRP/42366

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10244060003,10244062009

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1555002)
  - Calcium
  - Magnesium
  - Silver
  - Sodium
- MSD (Lab ID: 1555001)
  - Aluminum
  - Calcium
  - Iron
  - Manganese
  - Silver
  - Sodium
  - Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/42366

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1555000)
  - Manganese
  - Zinc
- MSD (Lab ID: 1555001)
  - Manganese
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 30, 2013

General Information:
14 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-01-092613 **Lab ID: 10244062001** Collected: 09/30/13 02:45 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0054**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 14:51	7429-90-5	B
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 14:51	7440-38-2	
Cadmium	**0.00084**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 14:51	7440-43-9	
Calcium	**91.0**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 14:56	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 14:51	7440-50-8	
Iron	**0.030J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 14:51	7439-89-6	
Lead	**0.00014**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 14:51	7439-92-1	
Magnesium	**26.6**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 14:56	7439-95-4	
Manganese	**0.44**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 14:51	7439-96-5	
Potassium	**7.6**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 14:51	7440-09-7	
Silica	**19.0**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 14:56	7631-86-9	
Silver	**0.00029J**	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 14:51	7440-22-4	B
Sodium	**47.1**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 14:56	7440-23-5	
Total Hardness by 2340B	**337**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 14:56		
Uranium-238	**0.0031**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 14:51	7440-61-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 14:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:08	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-02-092613 **Lab ID: 10244062002** Collected: 09/30/13 02:46 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.021**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 15:10	7429-90-5	
Arsenic	**0.0018**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 15:10	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 15:10	7440-43-9	
Calcium	**89.3**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 15:22	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 15:10	7440-50-8	
Iron	**0.037J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 15:10	7439-89-6	
Lead	**0.00022**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/24/13 10:48	7439-92-1	
Magnesium	**26.2**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 15:22	7439-95-4	
Manganese	**0.41**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 15:10	7439-96-5	
Potassium	**7.2**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 15:10	7440-09-7	
Silica	**18.9**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 15:22	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 15:10	7440-22-4	
Sodium	**46.4**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 15:22	7440-23-5	
Total Hardness by 2340B	**331**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 15:22		
Uranium-238	**0.0029**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 15:10	7440-61-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 15:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00023**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:10	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-03-092613 **Lab ID: 10244062003** Collected: 09/30/13 02:47 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0088**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 15:28	7429-90-5	B
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 15:28	7440-38-2	
Cadmium	**0.00090**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 15:28	7440-43-9	
Calcium	**88.6**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 15:35	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 15:28	7440-50-8	
Iron	**0.031J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 15:28	7439-89-6	
Lead	**0.00028**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 15:28	7439-92-1	
Magnesium	**25.2**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 15:35	7439-95-4	
Manganese	**0.34**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 15:28	7439-96-5	
Potassium	**6.8**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 15:28	7440-09-7	
Silica	**18.3**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 15:35	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 15:28	7440-22-4	
Sodium	**45.8**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 15:35	7440-23-5	
Total Hardness by 2340B	**325**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 15:35		
Uranium-238	**0.0029**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 15:28	7440-61-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 15:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:12	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-04-092613 **Lab ID: 10244062004** Collected: 09/30/13 02:48 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0078**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 15:41	7429-90-5	B
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 15:41	7440-38-2	
Cadmium	**0.0011**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 15:41	7440-43-9	
Calcium	**91.4**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 15:59	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 15:41	7440-50-8	
Iron	**0.033J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 15:41	7439-89-6	
Lead	**0.00026**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 15:41	7439-92-1	
Magnesium	**26.6**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 15:59	7439-95-4	
Manganese	**0.40**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 15:41	7439-96-5	
Potassium	**7.2**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 15:41	7440-09-7	
Silica	**19.6**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 15:59	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 15:41	7440-22-4	
Sodium	**46.7**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 15:59	7440-23-5	
Total Hardness by 2340B	**338**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 15:59		
Uranium-238	**0.0032**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 15:41	7440-61-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 15:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:14	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-05-092613 **Lab ID: 10244062005** Collected: 09/30/13 02:49 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0046**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 16:25	7429-90-5	B
Arsenic	**0.0019**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 16:25	7440-38-2	
Cadmium	**0.00090**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 16:25	7440-43-9	
Calcium	**89.6**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 16:30	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 16:25	7440-50-8	
Iron	**0.030J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 16:25	7439-89-6	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 16:25	7439-92-1	
Magnesium	**26.0**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 16:30	7439-95-4	
Manganese	**0.39**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 16:25	7439-96-5	
Potassium	**7.3**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 16:25	7440-09-7	
Silica	**18.7**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 16:30	7631-86-9	
Silver	**0.00020J**	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 16:25	7440-22-4	B
Sodium	**46.5**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 16:30	7440-23-5	
Total Hardness by 2340B	**331**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 16:30		
Uranium-238	**0.0026**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 16:25	7440-61-1	
Zinc	**0.13**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 16:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:16	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-06-092613 **Lab ID: 10244062006** Collected: 09/30/13 02:50 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0054**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 16:36	7429-90-5	B
Arsenic	**0.0017**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 16:36	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 16:36	7440-43-9	
Calcium	**90.2**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 16:48	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 16:36	7440-50-8	
Iron	**0.038J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 16:36	7439-89-6	
Lead	**0.00014**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/24/13 10:57	7439-92-1	
Magnesium	**25.7**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 16:48	7439-95-4	
Manganese	**0.45**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 16:36	7439-96-5	
Potassium	**6.9**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 16:36	7440-09-7	
Silica	**19.3**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 16:48	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 16:36	7440-22-4	
Sodium	**45.7**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 16:48	7440-23-5	
Total Hardness by 2340B	**331**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 16:48		
Uranium-238	**0.0025**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/24/13 10:57	7440-61-1	
Zinc	**0.18**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 16:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000090J**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:18	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-07-092613 **Lab ID: 10244062007** Collected: 09/30/13 02:51 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0068**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 16:54	7429-90-5	B
Arsenic	**0.0017**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 16:54	7440-38-2	
Cadmium	**0.00088**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 16:54	7440-43-9	
Calcium	**96.4**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 17:06	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 16:54	7440-50-8	
Iron	**0.029J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 16:54	7439-89-6	
Lead	**0.00021**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 16:54	7439-92-1	
Magnesium	**28.1**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 17:06	7439-95-4	
Manganese	**0.37**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 16:54	7439-96-5	
Potassium	**7.4**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 16:54	7440-09-7	
Silica	**20.7**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 17:06	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 16:54	7440-22-4	
Sodium	**50.4**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 17:06	7440-23-5	
Total Hardness by 2340B	**356**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 17:06		
Uranium-238	**0.0024**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 16:54	7440-61-1	
Zinc	**0.14**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 16:54	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00011J**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:20	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-08-092613 **Lab ID: 10244062008** Collected: 09/30/13 02:52 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0088**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 17:12	7429-90-5	B
Arsenic	**0.0018**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 17:12	7440-38-2	
Cadmium	**0.00096**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 17:12	7440-43-9	
Calcium	**94.7**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 17:24	7440-70-2	
Copper	**0.013**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 17:12	7440-50-8	
Iron	**0.037J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 17:12	7439-89-6	
Lead	**0.00026**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 17:12	7439-92-1	
Magnesium	**28.0**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 17:24	7439-95-4	
Manganese	**0.41**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 17:12	7439-96-5	
Potassium	**7.2**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 17:12	7440-09-7	
Silica	**20.9**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 17:24	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 17:12	7440-22-4	
Sodium	**50.6**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 17:24	7440-23-5	
Total Hardness by 2340B	**352**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 17:24		
Uranium-238	**0.0026**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 17:12	7440-61-1	
Zinc	**0.16**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 17:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00029**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:26	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-09-092613 **Lab ID: 10244062009** Collected: 09/30/13 02:52 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0040**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 17:49	7429-90-5	B
Arsenic	**0.0016**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 17:49	7440-38-2	
Cadmium	**0.00091**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 17:49	7440-43-9	
Calcium	**93.0**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 18:01	7440-70-2	M1
Copper	**0.014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 17:49	7440-50-8	
Iron	**0.035J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 17:49	7439-89-6	
Lead	**0.000097J**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 17:49	7439-92-1	
Magnesium	**27.4**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 18:01	7439-95-4	M1
Manganese	**0.36**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 17:49	7439-96-5	
Potassium	**7.6**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 17:49	7440-09-7	
Silica	**20.3**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 18:01	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/24/13 10:04	7440-22-4	M1
Sodium	**49.6**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 18:01	7440-23-5	M1
Total Hardness by 2340B	**345**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 18:01		
Uranium-238	**0.0018**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 17:49	7440-61-1	
Zinc	**0.15**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 17:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:28	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-10-092613 **Lab ID: 10244062010** Collected: 09/30/13 02:53 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0081**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 18:07	7429-90-5	B
Arsenic	**0.0016**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 18:07	7440-38-2	
Cadmium	**0.0010**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 18:07	7440-43-9	
Calcium	**97.6**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 18:20	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 18:07	7440-50-8	
Iron	**0.041J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 18:07	7439-89-6	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 18:07	7439-92-1	
Magnesium	**28.7**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 18:20	7439-95-4	
Manganese	**0.47**	mg/L	0.0025	0.00092	5	10/13/13 11:57	10/23/13 18:20	7439-96-5	
Potassium	**7.4**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 18:07	7440-09-7	
Silica	**21.8**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 18:20	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 18:07	7440-22-4	
Sodium	**51.0**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 18:20	7440-23-5	
Total Hardness by 2340B	**362**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 18:20		
Uranium-238	**0.0022**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 18:07	7440-61-1	
Zinc	**0.17**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 18:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000030J**	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:30	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-11-092613 **Lab ID: 10244062011** Collected: 09/30/13 02:54 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0035J**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 18:38	7429-90-5	B
Arsenic	**0.0016**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 18:38	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 18:38	7440-43-9	
Calcium	**102**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 19:09	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 18:38	7440-50-8	
Iron	**0.036J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 18:38	7439-89-6	
Lead	**0.000089J**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 18:38	7439-92-1	
Magnesium	**30.8**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 19:09	7439-95-4	
Manganese	**0.54**	mg/L	0.0025	0.00092	5	10/13/13 11:57	10/23/13 19:09	7439-96-5	
Potassium	**7.9**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 18:38	7440-09-7	
Silica	**22.3**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 19:09	7631-86-9	
Silver	**0.00018J**	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 18:38	7440-22-4	B
Sodium	**55.9**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 19:09	7440-23-5	
Total Hardness by 2340B	**383**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 19:09		
Uranium-238	**0.0022**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 18:38	7440-61-1	
Zinc	**0.19**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 18:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:33	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-12-092613 **Lab ID: 10244062012** Collected: 09/30/13 02:55 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0031J**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 19:15	7429-90-5	B
Arsenic	**0.0016**	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 19:15	7440-38-2	
Cadmium	**0.0012**	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 19:15	7440-43-9	
Calcium	**97.0**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 19:27	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 19:15	7440-50-8	
Iron	**0.038J**	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 19:15	7439-89-6	
Lead	**0.000090J**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 19:15	7439-92-1	
Magnesium	**27.8**	mg/L	0.025	0.012	5	10/13/13 11:57	10/23/13 19:27	7439-95-4	
Manganese	**0.54**	mg/L	0.0025	0.00092	5	10/13/13 11:57	10/23/13 19:27	7439-96-5	
Potassium	**7.9**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 19:15	7440-09-7	
Silica	**20.4**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 19:27	7631-86-9	
Silver	**0.00022J**	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 19:15	7440-22-4	B
Sodium	**50.6**	mg/L	0.25	0.051	5	10/13/13 11:57	10/23/13 19:27	7440-23-5	
Total Hardness by 2340B	**357**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 19:27		
Uranium-238	**0.0022**	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 19:15	7440-61-1	
Zinc	**0.22**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 19:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:35	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-13-092613 **Lab ID: 10244062013** Collected: 09/30/13 02:58 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.014**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 19:33	7429-90-5	B
Arsenic	ND	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 19:33	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 19:33	7440-43-9	
Calcium	**30.5**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 19:45	7440-70-2	
Copper	**0.0011**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 19:33	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 19:33	7439-89-6	
Lead	**0.000057J**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 19:33	7439-92-1	
Magnesium	**0.36**	mg/L	0.0050	0.0024	1	10/13/13 11:57	10/23/13 19:33	7439-95-4	
Manganese	**0.0011**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 19:33	7439-96-5	
Potassium	**0.89**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 19:33	7440-09-7	
Silica	**3.6**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 19:45	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 19:33	7440-22-4	
Sodium	**6.0**	mg/L	0.050	0.010	1	10/13/13 11:57	10/23/13 19:33	7440-23-5	
Total Hardness by 2340B	**77.7**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 19:45		
Uranium-238	ND	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 19:33	7440-61-1	
Zinc	**0.0023J**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 19:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:37	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Sample: LAO-BS-14-092613 **Lab ID: 10244062014** Collected: 09/30/13 03:00 Received: 10/01/13 08:58 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.014**	mg/L	0.0040	0.0015	1	10/13/13 11:57	10/23/13 19:51	7429-90-5	B
Arsenic	ND	mg/L	0.00050	0.000093	1	10/13/13 11:57	10/23/13 19:51	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	10/13/13 11:57	10/23/13 19:51	7440-43-9	
Calcium	**35.2**	mg/L	0.10	0.049	5	10/13/13 11:57	10/23/13 20:03	7440-70-2	
Copper	**0.0014**	mg/L	0.00050	0.00017	1	10/13/13 11:57	10/23/13 19:51	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	10/13/13 11:57	10/23/13 19:51	7439-89-6	
Lead	**0.000075J**	mg/L	0.00010	0.000046	1	10/13/13 11:57	10/23/13 19:51	7439-92-1	
Magnesium	**0.45**	mg/L	0.0050	0.0024	1	10/13/13 11:57	10/23/13 19:51	7439-95-4	
Manganese	**0.0034**	mg/L	0.00050	0.00018	1	10/13/13 11:57	10/23/13 19:51	7439-96-5	
Potassium	**0.90**	mg/L	0.020	0.0047	1	10/13/13 11:57	10/23/13 19:51	7440-09-7	
Silica	**3.5**	mg/L	0.27	0.13	5	10/13/13 11:57	10/23/13 20:03	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	10/13/13 11:57	10/23/13 19:51	7440-22-4	
Sodium	**6.1**	mg/L	0.050	0.010	1	10/13/13 11:57	10/23/13 19:51	7440-23-5	
Total Hardness by 2340B	**89.7**	mg/L	0.36	0.18	5	10/13/13 11:57	10/23/13 20:03		
Uranium-238	ND	mg/L	0.00050	0.00010	1	10/13/13 11:57	10/23/13 19:51	7440-61-1	
Zinc	**0.0061**	mg/L	0.0050	0.00098	1	10/13/13 11:57	10/23/13 19:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	10/12/13 07:20	10/14/13 13:39	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

QC Batch: MERP/9432 — Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 — Analysis Description: 245.1 Mercury
Associated Lab Samples: 10244062001, 10244062002, 10244062003, 10244062004, 10244062005, 10244062006, 10244062007, 10244062008, 10244062009, 10244062010, 10244062011, 10244062012, 10244062013, 10244062014

METHOD BLANK: 1541642 — Matrix: Water
Associated Lab Samples: 10244062001, 10244062002, 10244062003, 10244062004, 10244062005, 10244062006, 10244062007, 10244062008, 10244062009, 10244062010, 10244062011, 10244062012, 10244062013, 10244062014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/14/13 12:48	

LABORATORY CONTROL SAMPLE: 1541643

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1541644 — 1541645

Parameter	Units	10244060002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0044	0.0046	88	92	85-115	4	20	

MATRIX SPIKE SAMPLE: 1541646

Parameter	Units	10244062014 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0048	96	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

QC Batch: MPRP/42366 — Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 — Analysis Description: 200.8 MET
Associated Lab Samples: 10244062001, 10244062002, 10244062003, 10244062004, 10244062005, 10244062006, 10244062007, 10244062008, 10244062009, 10244062010, 10244062011, 10244062012, 10244062013, 10244062014

METHOD BLANK: 1542560 — Matrix: Water
Associated Lab Samples: 10244062001, 10244062002, 10244062003, 10244062004, 10244062005, 10244062006, 10244062007, 10244062008, 10244062009, 10244062010, 10244062011, 10244062012, 10244062013, 10244062014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0018J	0.0040	10/23/13 13:16	
Arsenic	mg/L	ND	0.00050	10/23/13 13:16	
Cadmium	mg/L	ND	0.000080	10/23/13 13:16	
Calcium	mg/L	ND	0.020	10/23/13 13:16	
Copper	mg/L	ND	0.00050	10/23/13 13:16	
Iron	mg/L	ND	0.050	10/23/13 13:16	
Lead	mg/L	ND	0.00010	10/23/13 13:16	
Magnesium	mg/L	ND	0.0050	10/23/13 13:16	
Manganese	mg/L	ND	0.00050	10/23/13 13:16	
Potassium	mg/L	ND	0.020	10/23/13 13:16	
Silver	mg/L	0.00014J	0.00050	10/23/13 13:16	
Sodium	mg/L	0.035J	0.050	10/23/13 13:16	
Uranium-238	mg/L	ND	0.00050	10/23/13 13:16	
Zinc	mg/L	ND	0.0050	10/23/13 13:16	

LABORATORY CONTROL SAMPLE: 1542561

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.075	94	85-115	
Arsenic	mg/L	.08	0.083	103	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Calcium	mg/L	1	0.93	93	85-115	
Copper	mg/L	.08	0.080	100	85-115	
Iron	mg/L	1	0.93	93	85-115	
Lead	mg/L	.08	0.079	98	85-115	
Magnesium	mg/L	1	0.99	99	85-115	
Manganese	mg/L	.08	0.073	92	85-115	
Potassium	mg/L	1	0.90	90	85-115	
Silver	mg/L	.08	0.080	100	85-115	
Sodium	mg/L	1	1.0	102	85-115	
Uranium-238	mg/L	.08	0.070	87	85-115	
Zinc	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1555000 — 1555001

Parameter	Units	10244060003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	2.7	.08	.08	3.8	3.9	1320	1470	70-130	3	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1555000 1555001

Parameter	Units	10244060003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.11	.08	.08	0.19	0.19	99	102	70-130	1	20	
Cadmium	mg/L	0.022	.08	.08	0.10	0.10	101	103	70-130	1	20	
Calcium	mg/L	102	1	1	102	104	35	170	70-130	1	20	M1
Copper	mg/L	1.5	.08	.08	1.6	1.6	74	124	70-130	3	20	
Iron	mg/L	11.0	1	1	12.2	12.5	118	149	70-130	3	20	M1
Lead	mg/L	0.052	.08	.08	0.13	0.13	99	103	70-130	2	20	
Magnesium	mg/L	29.3	1	1	28.9	30.3	-40	93	70-130	4	20	M1
Manganese	mg/L	3980 ug/L	.08	.08	4.0	4.1	17	169	70-130	3	20	E,M1
Potassium	mg/L	7320 ug/L	1	1	8.5	8.6	118	124	70-130	.8	20	
Silver	mg/L	ND	.08	.08	0.0018J	0.0036	2	5	70-130		20	M1
Sodium	mg/L	44000 ug/L	1	1	43.7	46.9	-28	296	70-130	7	20	M1
Uranium-238	mg/L	0.012	.08	.08	0.078	0.080	83	85	70-130	2	20	
Zinc	mg/L	5.5	.08	.08	5.6	5.7	62	231	70-130	2	20	E,M1

MATRIX SPIKE SAMPLE: 1555002

Parameter	Units	10244062009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.0040	.08	0.088	105	70-130	
Arsenic	mg/L	0.0016	.08	0.082	101	70-130	
Cadmium	mg/L	0.00091	.08	0.082	101	70-130	
Calcium	mg/L	93.0	1	93.6	55	70-130	M1
Copper	mg/L	0.014	.08	0.091	97	70-130	
Iron	mg/L	0.035J	1	0.97	93	70-130	
Lead	mg/L	0.000097J	.08	0.077	96	70-130	
Magnesium	mg/L	27.4	1	28.1	62	70-130	M1
Manganese	mg/L	0.36	.08	0.44	92	70-130	
Potassium	mg/L	7.6	1	8.4	79	70-130	
Silver	mg/L	ND	.08	0.00085J	1	70-130	M1
Sodium	mg/L	49.6	1	49.0	-56	70-130	M1
Uranium-238	mg/L	0.0018	.08	0.070	86	70-130	
Zinc	mg/L	0.15	.08	0.22	96	70-130	

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Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Bench Scale)-Rev
Pace Project No.: 10244062

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10244062001	**LAO-BS-01-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062002	**LAO-BS-02-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062003	**LAO-BS-03-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062004	**LAO-BS-04-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062005	**LAO-BS-05-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062006	**LAO-BS-06-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062007	**LAO-BS-07-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062008	**LAO-BS-08-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062009	**LAO-BS-09-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062010	**LAO-BS-10-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062011	**LAO-BS-11-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062012	**LAO-BS-12-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062013	**LAO-BS-13-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062014	**LAO-BS-14-092613**	EPA 200.8	MPRP/42366	EPA 200.8	ICPM/18029
10244062001	**LAO-BS-01-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062002	**LAO-BS-02-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062003	**LAO-BS-03-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062004	**LAO-BS-04-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062005	**LAO-BS-05-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062006	**LAO-BS-06-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062007	**LAO-BS-07-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062008	**LAO-BS-08-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062009	**LAO-BS-09-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062010	**LAO-BS-10-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062011	**LAO-BS-11-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062012	**LAO-BS-12-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062013	**LAO-BS-13-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835
10244062014	**LAO-BS-14-092613**	EPA 245.1	MERP/9432	EPA 245.1	MERC/10835

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1139

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10244062

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	~~LAO-SS-1~~				X						2				X	X	
	~~LAO-SS-1~~				X						2				X	X	
	~~LAO-SS-2~~				X						1				X		
	LAO-BS-01-092613	9/30/13	245														10244062001
	LAO-BS-02-092613		2:46														002
	LAO-BS-03-092613		2:47														003
	LAO-BS-04-092613		2:48														004
	LAO-BS-05-092613		2:49														005
	LAO-BS-06-092613		2:50														006
	LAO-BS-07-092613		251														007

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ RENE						
Sampler's Company: Pioneer Technical Services	DJ Rene / PTS	9/30	3:30	AA / Pace	10/1/13	8:58
Shipment Method: FedEx Ship Date: 9/30/13						
Shipment Tracking No. 5540 9197 7276						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10244062

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-2~~				X						1				X										
	LAO-BS-08-092613	9/30/13	2:52																						10244062 008
	LAO-BS-09-092613		2:52																						009
	LAO-BS-10-092613		2:53																						010
	LAO-BS-11-092613		2:54																						011
	LAO-BS-12-092613		2:55																						012
	LAO-BS-13-092613		2:58																						013
	LAO-BS-14-092613		3:00																						014

Sampler's Name: DJ Renz

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 9/30/13

Shipment Tracking No: 5540 9197 7276

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
DJ Renz / PTS	9/30	3:30	AA / Pace	10/1/13	8:58

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10244062

10244062

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 5540 9197 7276

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: _____ **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 ☑ B88A913252149 1 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.1 **Cooler Temp Corrected (°C):** 4.0 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** 10/1/13 KM

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? 10/2/13	☑ Yes	☐ No	☑ N/A	11. no dissolved test.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # LAO-BS-01,02,03,04,05,06,07,08,09,10 11,12,13,14
Per method, VOA pH is checked after analysis				Initial when completed: AM Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins -0.1	
Opened Time: 1720 Temp: 4.1	Corrected Temp: 4.0
Time: 1730 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 10/3/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory between August 13, 2013 and October 03, 2013. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 12/30/13 to add additional metals per the clients request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10244313001	**1**	Water		10/03/13 13:25
10238388001	**LAO-SS-1-080813**	Water	08/08/13 12:10	08/13/13 09:02
10238388002	**LAO-SS-1-081213**	Water	08/12/13 11:50	08/13/13 09:02
10238388003	**LAO-SS-1T-081213**	Water	08/12/13 11:54	08/13/13 09:02
10238388004	**LAO-SS-2-081213**	Water	08/12/13 12:12	08/13/13 09:02
10238388005	**LAO-SS-3-081213**	Water	08/12/13 12:30	08/13/13 09:02
10238388006	**LAO-SS-4-081213**	Water	08/12/13 11:38	08/13/13 09:02

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10238388001	**LAO-SS-1-080813**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10238388002	**LAO-SS-1-081213**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	LMF	1	PASI-M
		SM 2540D	LMF	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10238388003	**LAO-SS-1T-081213**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	LMF	1	PASI-M
		SM 2540D	LMF	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10238388004	**LAO-SS-2-081213**	EPA 200.8	TT3	16	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	LMF	1	PASI-M
		SM 2540D	LMF	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10238388005	**LAO-SS-3-081213**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	LMF	1	PASI-M
		SM 2540D	LMF	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10238388006	**LAO-SS-4-081213**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	LMF	1	PASI-M
		SM 2540D	LMF	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/41242

B: Analyte was detected in the associated method blank.

- BLANK for HBN 263742 [MPRP/412 (Lab ID: 1501025)
  - Calcium
  - Magnesium
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/41242

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10238388001,10238388011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1501027)
  - Calcium
  - Magnesium
  - Potassium
  - Silver
  - Sodium
- MS (Lab ID: 1501029)

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 28, 2014

QC Batch: MPRP/41242

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10238388001,10238388011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Calcium
- Silver
- Sodium

- MSD (Lab ID: 1501028)
  - Calcium
  - Magnesium
  - Potassium
  - Silver
  - Sodium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/41242

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1501027)
  - Calcium
  - Sodium
- MS (Lab ID: 1501029)
  - Calcium
  - Sodium
- MSD (Lab ID: 1501028)
  - Calcium
  - Sodium

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/31888

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10238563002,10238889001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1506548)
  - Alkalinity, Total as CaCO3

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: January 28, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/15792

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10237949001,10238388002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1503465)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1503467)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1503466)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1503468)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Sample: LAO-SS-1-080813 **Lab ID: 10238388001** Collected: 08/08/13 12:10 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.027**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 16:12	7429-90-5	
Arsenic	**0.014**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 16:12	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 16:12	7440-43-9	
Calcium	**116**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 11:11	7440-70-2	M1
Copper	**0.012**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 16:12	7440-50-8	
Iron	**0.045J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 16:12	7439-89-6	
Lead	**0.0017**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 16:12	7439-92-1	
Magnesium	**21.8**	mg/L	0.0050	0.0024	1	08/15/13 12:09	08/26/13 16:12	7439-95-4	M1
Silver	**0.000064J**	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 16:12	7440-22-4	B,M1
Total Hardness by 2340B	**380**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 11:11		
Uranium-238	**0.0013**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 16:12	7440-61-1	
Zinc	**0.038**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 16:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 12:51	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Sample: LAO-SS-1-081213 **Lab ID: 10238388002** Collected: 08/12/13 11:50 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.013**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 16:23	7429-90-5	
Arsenic	**0.0064**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 16:23	7440-38-2	
Cadmium	**0.000095**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 16:23	7440-43-9	
Calcium	**120**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 11:16	7440-70-2	
Copper	**0.0088**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 16:23	7440-50-8	
Iron	**0.026J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 16:23	7439-89-6	
Lead	**0.0011**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 16:23	7439-92-1	
Magnesium	**19.5**	mg/L	0.0050	0.0024	1	08/15/13 12:09	08/26/13 16:23	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 16:23	7440-22-4	
Total Hardness by 2340B	**379**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 11:16		
Uranium-238	**0.00046J**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 16:23	7440-61-1	
Zinc	**0.035**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 16:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 12:59	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**19.0**	mg/L	5.0	2.5	1		08/22/13 14:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**743**	mg/L	10.0	5.0	1		08/14/13 14:13		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/14/13 10:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.54**	mg/L	0.10	0.050	1		08/20/13 10:54		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Sample: LAO-SS-1T-081213 **Lab ID: 10238388003** Collected: 08/12/13 11:54 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.013**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 16:28	7429-90-5	
Arsenic	**0.0063**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 16:28	7440-38-2	
Cadmium	**0.00010**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 16:28	7440-43-9	
Calcium	**120**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 11:21	7440-70-2	
Copper	**0.0090**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 16:28	7440-50-8	
Iron	**0.026J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 16:28	7439-89-6	
Lead	**0.0011**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 16:28	7439-92-1	
Magnesium	**19.4**	mg/L	0.0050	0.0024	1	08/15/13 12:09	08/26/13 16:28	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 16:28	7440-22-4	
Total Hardness by 2340B	**379**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 11:21		
Uranium-238	**0.00044J**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 16:28	7440-61-1	
Zinc	**0.034**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 16:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:06	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**18.6**	mg/L	5.0	2.5	1		08/22/13 14:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**739**	mg/L	10.0	5.0	1		08/14/13 14:13		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/14/13 10:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.48**	mg/L	0.10	0.050	1		08/20/13 10:59		

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Sample: LAO-SS-2-081213 **Lab ID: 10238388004** Collected: 08/12/13 12:12 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.059**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 16:33	7429-90-5	
Arsenic	**0.040**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 16:33	7440-38-2	
Cadmium	**0.022**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 16:33	7440-43-9	
Calcium	**120**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 11:48	7440-70-2	
Copper	**0.46**	mg/L	0.010	0.0035	20	08/15/13 12:09	08/27/13 11:48	7440-50-8	
Iron	**2.3**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 16:33	7439-89-6	
Lead	**0.0015**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 16:33	7439-92-1	
Magnesium	**32.6**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 11:48	7439-95-4	
Manganese	**4.9**	mg/L	0.010	0.0037	20	08/15/13 12:09	08/27/13 11:48	7439-96-5	
Potassium	**8.7**	mg/L	0.020	0.0047	1	08/15/13 12:09	08/26/13 16:33	7440-09-7	
Silica	**28.5**	mg/L	1.1	0.54	20	08/15/13 12:09	08/27/13 11:48	7631-86-9	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 16:33	7440-22-4	
Sodium	**53.0**	mg/L	1.0	0.21	20	08/15/13 12:09	08/27/13 11:48	7440-23-5	
Total Hardness by 2340B	**435**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 11:48		
Uranium-238	**0.0098**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 16:33	7440-61-1	
Zinc	**5.4**	mg/L	0.10	0.020	20	08/15/13 12:09	08/27/13 11:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:09	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**77.8**	mg/L	5.0	2.5	1		08/22/13 14:22		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**806**	mg/L	10.0	5.0	1		08/14/13 14:14		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/14/13 10:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.60**	mg/L	0.10	0.050	1		08/20/13 10:59		

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Sample: LAO-SS-3-081213 **Lab ID: 10238388005** Collected: 08/12/13 12:30 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.32**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 16:38	7429-90-5	
Arsenic	**0.0039**	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 16:38	7440-38-2	
Cadmium	**0.032**	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 16:38	7440-43-9	
Calcium	**125**	mg/L	0.40	0.20	20	08/15/13 12:09	08/27/13 11:53	7440-70-2	
Copper	**1.6**	mg/L	0.010	0.0035	20	08/15/13 12:09	08/27/13 11:53	7440-50-8	
Iron	**10.3**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 16:38	7439-89-6	
Lead	**0.0013**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 16:38	7439-92-1	
Magnesium	**36.9**	mg/L	0.10	0.048	20	08/15/13 12:09	08/27/13 11:53	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 16:38	7440-22-4	
Total Hardness by 2340B	**465**	mg/L	1.4	0.71	20	08/15/13 12:09	08/27/13 11:53		
Uranium-238	**0.013**	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 16:38	7440-61-1	
Zinc	**7.0**	mg/L	0.10	0.020	20	08/15/13 12:09	08/27/13 11:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:11	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**66.1**	mg/L	5.0	2.5	1		08/22/13 14:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**945**	mg/L	10.0	5.0	1		08/15/13 15:34		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**22.1**	mg/L	10.0	5.0	1		08/14/13 10:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.1**	mg/L	0.10	0.050	1		08/20/13 11:00		

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ANALYTICAL RESULTS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Sample: LAO-SS-4-081213 **Lab ID: 10238388006** Collected: 08/12/13 11:38 Received: 08/13/13 09:02 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0028J**	mg/L	0.0040	0.0015	1	08/15/13 12:09	08/26/13 16:43	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.000093	1	08/15/13 12:09	08/26/13 16:43	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	08/15/13 12:09	08/26/13 16:43	7440-43-9	
Calcium	**0.096**	mg/L	0.020	0.0098	1	08/15/13 12:09	08/26/13 16:43	7440-70-2	B
Copper	**0.0025**	mg/L	0.00050	0.00017	1	08/15/13 12:09	08/26/13 16:43	7440-50-8	
Iron	**0.0065J**	mg/L	0.050	0.0059	1	08/15/13 12:09	08/26/13 16:43	7439-89-6	
Lead	**0.000081J**	mg/L	0.00010	0.000046	1	08/15/13 12:09	08/26/13 16:43	7439-92-1	
Magnesium	**0.020**	mg/L	0.0050	0.0024	1	08/15/13 12:09	08/26/13 16:43	7439-95-4	B
Silver	ND	mg/L	0.00050	0.000050	1	08/15/13 12:09	08/26/13 16:43	7440-22-4	
Total Hardness by 2340B	**0.32**	mg/L	0.071	0.036	1	08/15/13 12:09	08/26/13 16:43		
Uranium-238	ND	mg/L	0.00050	0.00010	1	08/15/13 12:09	08/26/13 16:43	7440-61-1	
Zinc	**0.0061**	mg/L	0.0050	0.00098	1	08/15/13 12:09	08/26/13 16:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	08/15/13 13:06	08/20/13 13:13	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		08/22/13 14:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**15.0**	mg/L	10.0	5.0	1		08/15/13 15:35		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/14/13 10:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		08/20/13 11:00		

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: MERP/9048 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10238388001, 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

METHOD BLANK: 1500933 | Matrix: Water
Associated Lab Samples: 10238388001, 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/20/13 12:46	

LABORATORY CONTROL SAMPLE: 1500934

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1500935 1500936

Parameter	Units	10238388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0053	102	107	85-115	5	20	

MATRIX SPIKE SAMPLE: 1500937

Parameter	Units	10238388020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0050	100	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: MPRP/41242 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10238388001, 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

METHOD BLANK: 1501025 Matrix: Water
Associated Lab Samples: 10238388001, 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	08/26/13 16:07	
Arsenic	mg/L	ND	0.00050	08/26/13 16:07	
Cadmium	mg/L	ND	0.000080	08/26/13 16:07	
Calcium	mg/L	0.0098J	0.020	08/26/13 16:07	
Copper	mg/L	ND	0.00050	08/26/13 16:07	
Iron	mg/L	ND	0.050	08/26/13 16:07	
Lead	mg/L	ND	0.00010	08/26/13 16:07	
Magnesium	mg/L	0.0025J	0.0050	08/26/13 16:07	
Manganese	mg/L	ND	0.00050	08/26/13 16:07	
Potassium	mg/L	ND	0.020	08/26/13 16:07	
Silver	mg/L	0.00012J	0.00050	08/26/13 16:07	
Sodium	mg/L	ND	0.050	08/26/13 16:07	
Uranium-238	mg/L	ND	0.00050	08/26/13 16:07	
Zinc	mg/L	ND	0.0050	08/26/13 16:07	

LABORATORY CONTROL SAMPLE: 1501026

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	103	85-115	
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.083	103	85-115	
Calcium	mg/L	1	1.1	106	85-115	
Copper	mg/L	.08	0.081	101	85-115	
Iron	mg/L	1	1.0	102	85-115	
Lead	mg/L	.08	0.084	104	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Manganese	mg/L	.08	0.083	103	85-115	
Potassium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.080	101	85-115	
Sodium	mg/L	1	1.0	104	85-115	
Uranium-238	mg/L	.08	0.082	103	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1501027 1501028

Parameter	Units	10238388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.027	.08	.08	0.11	0.12	109	122	70-130	9	20	
Arsenic	mg/L	0.014	.08	.08	0.10	0.10	109	109	70-130	.1	20	
Cadmium	mg/L	0.00013	.08	.08	0.087	0.086	108	107	70-130	1	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1501027 1501028

Parameter	Units	10238388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	116	1	1	131	130	1440	1420	70-130	.2	20	E,M1
Copper	mg/L	0.012	.08	.08	0.10	0.10	113	111	70-130	1	20	
Iron	mg/L	0.045J	1	1	1.1	1.1	104	104	70-130	.2	20	
Lead	mg/L	0.0017	.08	.08	0.081	0.080	99	98	70-130	1	20	
Magnesium	mg/L	21.8	1	1	23.4	23.7	169	195	70-130	1	20	M1
Manganese	mg/L	0.035	.08	.08	0.12	0.12	106	104	70-130	1	20	
Potassium	mg/L	8.5	1	1	10.1	10	158	149	70-130	.9	20	M1
Silver	mg/L	0.000064J	.08	.08	0.033	0.034	41	42	70-130	2	20	M1
Sodium	mg/L	60.8	1	1	63.7	63.8	290	296	70-130	.09	20	E,M1
Uranium-238	mg/L	0.0013	.08	.08	0.083	0.082	103	101	70-130	1	20	
Zinc	mg/L	0.038	.08	.08	0.12	0.12	108	108	70-130	.2	20	

MATRIX SPIKE SAMPLE: 1501029

Parameter	Units	10238388011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.0052	.08	0.091	107	70-130	
Arsenic	mg/L	0.0027	.08	0.087	106	70-130	
Cadmium	mg/L	0.0011	.08	0.084	103	70-130	
Calcium	mg/L	96.7	1	110	1380	70-130	E,M1
Copper	mg/L	0.012	.08	0.092	101	70-130	
Iron	mg/L	0.012J	1	1.0	102	70-130	
Lead	mg/L	0.00017	.08	0.081	101	70-130	
Magnesium	mg/L	26.6	1	27.8	126	70-130	
Manganese	mg/L	0.35	.08	0.43	112	70-130	
Potassium	mg/L	7.8	1	9.0	121	70-130	
Silver	mg/L	ND	.08	0.031	38	70-130	M1
Sodium	mg/L	46.6	1	52.6	602	70-130	E,M1
Uranium-238	mg/L	0.0042	.08	0.086	103	70-130	
Zinc	mg/L	0.13	.08	0.22	109	70-130	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: WET/31888 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

METHOD BLANK: 1506544 | Matrix: Water
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	08/22/13 13:36	

LABORATORY CONTROL SAMPLE & LCSD: 1506545 1506546

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.6	40.5	101	101	90-110	.1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1506547 1506548

Parameter	Units	10238889001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	187	40	40	220	217	82	76	80-120	1	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1506549 1506550

Parameter	Units	10238563002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	48.8	40	40	90.6	90.4	105	104	80-120	.2	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: WET/31783 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10238388002, 10238388003, 10238388004

METHOD BLANK: 1501497 Matrix: Water
Associated Lab Samples: 10238388002, 10238388003, 10238388004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	08/14/13 14:05	

LABORATORY CONTROL SAMPLE: 1501496

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	946	95	80-120	

SAMPLE DUPLICATE: 1501498

Parameter	Units	10238131018 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1750	1760	.6	10	

SAMPLE DUPLICATE: 1501499

Parameter	Units	10238388004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	806	819	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: WET/31819 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10238388005, 10238388006

METHOD BLANK: 1502821 | Matrix: Water
Associated Lab Samples: 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	08/15/13 15:17	

LABORATORY CONTROL SAMPLE: 1502822

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1020	102	80-120	

SAMPLE DUPLICATE: 1502823

Parameter	Units	10238561001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	88.0	87.0	1	10	

SAMPLE DUPLICATE: 1502824

Parameter	Units	10238682003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	99.0	98.0	1	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: WET/31784 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

METHOD BLANK: 1501501 Matrix: Water
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/14/13 10:00	

METHOD BLANK: 1501505 Matrix: Water
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/14/13 10:00	

LABORATORY CONTROL SAMPLE: 1501502

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	90.4	90	80-120	

SAMPLE DUPLICATE: 1501503

Parameter	Units	10238512001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1501504

Parameter	Units	10238526001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	46.4	45.4	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

QC Batch: WETA/15792 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

METHOD BLANK: 1503463 | Matrix: Water
Associated Lab Samples: 10238388002, 10238388003, 10238388004, 10238388005, 10238388006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	08/20/13 10:27	

LABORATORY CONTROL SAMPLE: 1503464

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.7	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1503465 1503466

Parameter	Units	10237949001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	2.2	2.5	2.5	2.8	3.1	27	37	80-120	8	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1503467 1503468

Parameter	Units	10238388002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.54	2.5	2.5	1.5	1.6	38	40	80-120	4	30	M1

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QUALIFIERS

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands-Revised
Pace Project No.: 10244313

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10238388001	**LAO-SS-1-080813**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388002	**LAO-SS-1-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388003	**LAO-SS-1T-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388004	**LAO-SS-2-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388005	**LAO-SS-3-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388006	**LAO-SS-4-081213**	EPA 200.8	MPRP/41242	EPA 200.8	ICPM/17322
10238388001	**LAO-SS-1-080813**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388002	**LAO-SS-1-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388003	**LAO-SS-1T-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388004	**LAO-SS-2-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388005	**LAO-SS-3-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388006	**LAO-SS-4-081213**	EPA 245.1	MERP/9048	EPA 245.1	MERC/10344
10238388002	**LAO-SS-1-081213**	SM 2320B	WET/31888		
10238388003	**LAO-SS-1T-081213**	SM 2320B	WET/31888		
10238388004	**LAO-SS-2-081213**	SM 2320B	WET/31888		
10238388005	**LAO-SS-3-081213**	SM 2320B	WET/31888		
10238388006	**LAO-SS-4-081213**	SM 2320B	WET/31888		
10238388002	**LAO-SS-1-081213**	SM 2540C	WET/31783		
10238388003	**LAO-SS-1T-081213**	SM 2540C	WET/31783		
10238388004	**LAO-SS-2-081213**	SM 2540C	WET/31783		
10238388005	**LAO-SS-3-081213**	SM 2540C	WET/31819		
10238388006	**LAO-SS-4-081213**	SM 2540C	WET/31819		
10238388002	**LAO-SS-1-081213**	SM 2540D	WET/31784		
10238388003	**LAO-SS-1T-081213**	SM 2540D	WET/31784		
10238388004	**LAO-SS-2-081213**	SM 2540D	WET/31784		
10238388005	**LAO-SS-3-081213**	SM 2540D	WET/31784		
10238388006	**LAO-SS-4-081213**	SM 2540D	WET/31784		
10238388002	**LAO-SS-1-081213**	SM 4500-NO3 H	WETA/15792		
10238388003	**LAO-SS-1T-081213**	SM 4500-NO3 H	WETA/15792		
10238388004	**LAO-SS-2-081213**	SM 4500-NO3 H	WETA/15792		
10238388005	**LAO-SS-3-081213**	SM 4500-NO3 H	WETA/15792		
10238388006	**LAO-SS-4-081213**	SM 4500-NO3 H	WETA/15792		

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
BP Facility No: LAO Wetlands (Monthly)
Req Due Date (mm/dd/yy): 1125 1127
Rush TAT: Yes ___ No x
Lab Work Order Number: 10238388

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info.		Stage:	Activity:	Invoice To:	BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate+Nitrite	TDS/TSS/Alkalinity					Comments
	LAO-SS-1 - 080813	8/8/13	12:10		X			2	1	1	2				X	X	X	X							10238388001
	LAO-SS-1 - 081213	8/12/13	11:50		X			4	1	1	2				X	X	X	X	X	X					FIELD GRABS FOR SS-1, 002
	LAO-SS-1T - 081213	8/12/13	11:54		X			3	1	1	1				X	X	X		X	X					SS-1T DUE TO 003
	LAO-SS-2 - 081213	8/12/13	12:12		X			3	1	1	1				X	X	X		X	X					004 SAMPLER MALFUNCTIONS
	LAO-SS-3 - 081213	8/12/13	12:30		X			3	1	1	1				X	X	X		X	X					005
	LAO-SS-4 - 081213	8/12/13	11:38		X			3	1	1	1				X	X	X		X	X					006

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ KISSELL						
Sampler's Company: Pioneer Technical Services	[signature] IPTS	8/12/13	13:20	[signature] PACE	8/13/13	902
Shipment Method: FED EX Ship Date: 8/12/13						
Shipment Tracking No: 5540 9197 7335						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 8.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

1125 1127

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10238388

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-2~~				X						1				X										
	LAO-BS-01-081213	8/12/13	1340		X			1			1				X										10238388007
	LAO-BS-02-081213		1342		X			1			1				X										008
	LAO-BS-03-081213		1344		X			1			1				X										009
	LAO-BS-04-081213		1346		X			1			1				X										010
	LAO-BS-05-081213		1348		X			1			1				X										011
	LAO-BS-06-081213		1350		X			1			1				X										012
	LAO-BS-07-081213		1352		X			1			1				X										013

Sampler's Name: Tom Hickey + CJ Kissell

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 8/12/13

Shipment Tracking No:

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] IPTS	8/12/13	1320	[signature] PACE	8/13/13	902
[signature] IPTS	"	1320			

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 8.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils | Req Due Date (mm/dd/yy): 1126 1127 | Rush TAT: Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) | Lab Work Order Number: 10238388

Lab Name:	Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM:	Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode: Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-2~~				X						1				X										
	LAO-BS-08-081213	8/12/13	1354		X			1			1				X										10238388014
	LAO-BS-09-081213		1356		X			1			1				X										015
	LAO-BS-10-081213		1358		X			1			1				X										016
	LAO-BS-11-081213		~~1500~~ 1400		X			1			1				X										017
	LAO-BS-12-081213		1402		X			1			1				X										018
	LAO-BS-13-081213		1404		X			1			1				X										019
	LAO-BS-14-081213		1406		X			1			1				X										020

Sampler's Name: Tom Hulkey + CJ Kissell	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] IPTS	8/12/13	1320	[signature] PACE	8/13/13	9:02
Shipment Method: FedEx Ship Date: 8/12/13	[signature] IPTS	"	1320			
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 8.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10238388

10238388

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9197 7335

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 8.3 **Cooler Temp Corrected (°C):** 8.5 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** 8/13/13

Comments:

				Comments
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☒ No	☐ N/A	12. #1 COC 2 HNO3, 1 H2SO4, 1 BP1U ACTUAL 2 HNO3
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☒ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1,2 2/2 2-5 1/1 5-18 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Brad H. Date/Time: 8/13/13

Comments/Resolution: -OK to proceed out of temp.

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 10:15	Temp: 8.3	Corrected Temp: 8.5	
Time: 10:30	put in cooler 8.3	8.5	
Time:	Temp:	Corrected Temp:	

Project Manager Review: **Date:** 8/13/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

COMPLETE 2014 BTL LABORATORY ANALYTICAL REPORTS

2013 Butte Treatment Lagoons (BTL) Storm Water Treatment Evaluation Technical Report

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 22, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10254111

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on January 07, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10254111

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10254111

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10254111001	**LAO-SS-1-010214**	Water	01/02/14 13:30	01/07/14 11:43
10254111002	**LAO-SS-1-010614**	Water	01/06/14 13:20	01/07/14 11:43
10254111003	**LAO-SS-2-010614**	Water	01/06/14 13:30	01/07/14 11:43

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Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10254111

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10254111001	**LAO-SS-1-010214**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10254111002	**LAO-SS-1-010614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10254111003	**LAO-SS-2-010614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10254111

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 22, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44012

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10254111001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1606043)
  - Calcium
  - Magnesium
  - Silver
  - Zinc
- MSD (Lab ID: 1606044)
  - Calcium
  - Magnesium
  - Silver

Additional Comments:

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1700 Elm Street - Suite 200
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(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10254111

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 22, 2014

Analyte Comments:

QC Batch: MPRP/44012

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1606043)
  - Calcium
- MSD (Lab ID: 1606044)
  - Calcium

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10254111

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 22, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10254111

Sample: LAO-SS-1-010214 **Lab ID: 10254111001** Collected: 01/02/14 13:30 Received: 01/07/14 11:43 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0045**	mg/L	0.0040	0.0015	1	01/09/14 09:30	01/10/14 08:44	7429-90-5	
Arsenic	**0.0044**	mg/L	0.00050	0.000093	1	01/09/14 09:30	01/10/14 08:44	7440-38-2	
Cadmium	**0.00019**	mg/L	0.000080	0.000032	1	01/09/14 09:30	01/10/14 08:44	7440-43-9	
Calcium	**124**	mg/L	0.40	0.20	20	01/09/14 09:30	01/09/14 20:28	7440-70-2	M1
Copper	**0.0067**	mg/L	0.00050	0.00017	1	01/09/14 09:30	01/10/14 08:44	7440-50-8	
Iron	**0.019J**	mg/L	0.050	0.0059	1	01/09/14 09:30	01/10/14 08:44	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	01/09/14 09:30	01/10/14 08:44	7439-92-1	
Magnesium	**34.2**	mg/L	0.10	0.048	20	01/09/14 09:30	01/09/14 20:28	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	01/09/14 09:30	01/10/14 08:44	7440-22-4	M1
Total Hardness by 2340B	**450**	mg/L	1.4	0.71	20	01/09/14 09:30	01/09/14 20:28		
Uranium-238	**0.0089**	mg/L	0.00050	0.00010	1	01/09/14 09:30	01/10/14 08:44	7440-61-1	
Zinc	**0.053**	mg/L	0.0050	0.00098	1	01/09/14 09:30	01/10/14 08:44	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/08/14 13:01	01/09/14 12:46	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10254111

Sample: LAO-SS-1-010614 **Lab ID: 10254111002** Collected: 01/06/14 13:20 Received: 01/07/14 11:43 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0064**	mg/L	0.0040	0.0015	1	01/09/14 09:30	01/10/14 08:49	7429-90-5	
Arsenic	**0.0043**	mg/L	0.00050	0.000093	1	01/09/14 09:30	01/10/14 08:49	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000032	1	01/09/14 09:30	01/10/14 08:49	7440-43-9	
Calcium	**124**	mg/L	0.40	0.20	20	01/09/14 09:30	01/09/14 20:02	7440-70-2	
Copper	**0.0062**	mg/L	0.00050	0.00017	1	01/09/14 09:30	01/10/14 08:49	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0059	1	01/09/14 09:30	01/10/14 08:49	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	01/09/14 09:30	01/10/14 08:49	7439-92-1	
Magnesium	**33.3**	mg/L	0.10	0.048	20	01/09/14 09:30	01/09/14 20:02	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/09/14 09:30	01/10/14 08:49	7440-22-4	
Total Hardness by 2340B	**448**	mg/L	1.4	0.71	20	01/09/14 09:30	01/09/14 20:02		
Uranium-238	**0.0088**	mg/L	0.00050	0.00010	1	01/09/14 09:30	01/10/14 08:49	7440-61-1	
Zinc	**0.049**	mg/L	0.0050	0.00098	1	01/09/14 09:30	01/10/14 08:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/08/14 13:01	01/09/14 12:48	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10254111

Sample: LAO-SS-2-010614 **Lab ID: 10254111003** Collected: 01/06/14 13:30 Received: 01/07/14 11:43 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.10**	mg/L	0.0040	0.0015	1	01/09/14 09:30	01/10/14 08:53	7429-90-5	
Arsenic	**0.027**	mg/L	0.00050	0.000093	1	01/09/14 09:30	01/10/14 08:53	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000032	1	01/09/14 09:30	01/10/14 08:53	7440-43-9	
Calcium	**141**	mg/L	0.40	0.20	20	01/09/14 09:30	01/09/14 19:57	7440-70-2	
Copper	**0.51**	mg/L	0.010	0.0035	20	01/09/14 09:30	01/09/14 19:57	7440-50-8	
Iron	**3.5**	mg/L	0.050	0.0059	1	01/09/14 09:30	01/10/14 08:53	7439-89-6	
Lead	**0.011**	mg/L	0.00010	0.000046	1	01/09/14 09:30	01/10/14 08:53	7439-92-1	
Magnesium	**36.0**	mg/L	0.10	0.048	20	01/09/14 09:30	01/09/14 19:57	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/09/14 09:30	01/10/14 08:53	7440-22-4	
Total Hardness by 2340B	**501**	mg/L	1.4	0.71	20	01/09/14 09:30	01/09/14 19:57		
Uranium-238	**0.015**	mg/L	0.00050	0.00010	1	01/09/14 09:30	01/10/14 08:53	7440-61-1	
Zinc	**5.3**	mg/L	0.10	0.020	20	01/09/14 09:30	01/09/14 19:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/08/14 13:01	01/09/14 12:54	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10254111

QC Batch: MERP/9905 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10254111001, 10254111002, 10254111003

METHOD BLANK: 1605814 Matrix: Water
Associated Lab Samples: 10254111001, 10254111002, 10254111003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	01/09/14 12:41	

LABORATORY CONTROL SAMPLE: 1605815

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1605816 1605817

Parameter	Units	10254111002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0048	102	96	85-115	6	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10254111

QC Batch: MPRP/44012 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10254111001, 10254111002, 10254111003

METHOD BLANK: 1606041 Matrix: Water
Associated Lab Samples: 10254111001, 10254111002, 10254111003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	01/09/14 21:00	
Arsenic	mg/L	ND	0.00050	01/10/14 08:35	
Cadmium	mg/L	ND	0.000080	01/10/14 08:35	
Calcium	mg/L	ND	0.020	01/10/14 08:35	
Copper	mg/L	ND	0.00050	01/10/14 08:35	
Iron	mg/L	ND	0.050	01/10/14 08:35	
Lead	mg/L	ND	0.00010	01/10/14 08:35	
Magnesium	mg/L	ND	0.0050	01/10/14 08:35	
Silver	mg/L	ND	0.00050	01/10/14 08:35	
Uranium-238	mg/L	ND	0.00050	01/10/14 08:35	
Zinc	mg/L	0.0029J	0.0050	01/10/14 08:35	

LABORATORY CONTROL SAMPLE: 1606042

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	106	85-115	
Arsenic	mg/L	.08	0.083	103	85-115	
Cadmium	mg/L	.08	0.084	105	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.086	108	85-115	
Iron	mg/L	1	1.1	107	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.1	110	85-115	
Silver	mg/L	.08	0.087	109	85-115	
Uranium-238	mg/L	.08	0.086	108	85-115	
Zinc	mg/L	.08	0.087	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1606043 1606044

Parameter	Units	10254111001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0045	.08	.08	0.088	0.087	104	103	70-130	1	20	
Arsenic	mg/L	0.0044	.08	.08	0.090	0.089	106	105	70-130	.9	20	
Cadmium	mg/L	0.00019	.08	.08	0.085	0.085	106	106	70-130	.2	20	
Calcium	mg/L	124	1	1	128	124	366	16	70-130	3	20	E,M1
Copper	mg/L	0.0067	.08	.08	0.092	0.091	107	106	70-130	.8	20	
Iron	mg/L	0.019J	1	1	1.1	1.1	106	104	70-130	2	20	
Lead	mg/L	0.00016	.08	.08	0.082	0.082	102	102	70-130	0	20	
Magnesium	mg/L	34.2	1	1	37.0	37.2	275	303	70-130	.8	20	M1
Silver	mg/L	ND	.08	.08	0.025	0.031	32	39	70-130	19	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10254111

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1606043 1606044

Parameter	Units	10254111001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0089	.08	.08	0.094	0.094	107	106	70-130	.3	20	
Zinc	mg/L	0.053	.08	.08	0.16	0.14	132	110	70-130	11	20	M1

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10254111

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10254111

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10254111001	**LAO-SS-1-010214**	EPA 200.8	MPRP/44012	EPA 200.8	ICPM/18945
10254111002	**LAO-SS-1-010614**	EPA 200.8	MPRP/44012	EPA 200.8	ICPM/18945
10254111003	**LAO-SS-2-010614**	EPA 200.8	MPRP/44012	EPA 200.8	ICPM/18945
10254111001	**LAO-SS-1-010214**	EPA 245.1	MERP/9905	EPA 245.1	MERC/11387
10254111002	**LAO-SS-1-010614**	EPA 245.1	MERP/9905	EPA 245.1	MERC/11387
10254111003	**LAO-SS-2-010614**	EPA 245.1	MERP/9905	EPA 245.1	MERC/11387

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Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10254111

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 - 010214	1/2/14	1330		X						2				X	X	10254111001
	LAO-SS-1 - 010614	1/6/14	1320		X						2				X	X	002
	LAO-SS-2 - 010614	1/6/14	1330		X						1				X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: CJ Kissell

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 1/6/14

Shipment Tracking No: 8690 6816 2470

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
CJK	1/6/14	1430	Pace	1-7-14	1143

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt - ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO# : 10254111

10254111

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 869068162470

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: _____ **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ 888A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.0 **Cooler Temp Corrected (°C):** 0.2 **Biological Tissue Frozen?** ☐ Yes ☑ No

Temp should be above freezing to 6°C **Correction Factor:** +.2 **Date and Initials of Person Examining Contents:** JP 1.7.14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8. no ms/msd
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1-2: 2of2 3: 1of1
Per method, VOA pH is checked after analysis				Initial when completed: JP Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 12:45 Temp: 5.4	Corrected Temp: 5.6	
Time: 12:51 put in cooler		
Time: Temp:	Corrected Temp:	

Project Manager Review: Sally Heinje Digitally signed by Sally Heinje DN: cn=Sally Heinje, o=Pace Analytical, ou, email=sally.heinje@pacelabs.com, c=US Date: 2014.01.08 09:19:22 -06'00' **Date:** _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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1700 Elm Street - Suite 200
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(612)607-1700

January 27, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on January 14, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10254828001	**LAO-SS-1-010914**	Water	01/09/14 12:15	01/14/14 11:15
10254828002	**LAO-SS-1-011314**	Water	01/13/14 14:14	01/14/14 11:15
10254828003	**LAO-SS-2-011314**	Water	01/13/14 15:00	01/14/14 11:15

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10254828001	**LAO-SS-1-010914**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10254828002	**LAO-SS-1-011314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10254828003	**LAO-SS-2-011314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 27, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44082

B: Analyte was detected in the associated method blank.

- BLANK for HBN 283750 [MPRP/440 (Lab ID: 1608846)
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44082

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10254828001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1608848)
  - Calcium
  - Magnesium
  - Silver
- MSD (Lab ID: 1608849)
  - Calcium
  - Magnesium
  - Silver

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Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 27, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/44082

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1608848)
  - Calcium
- MSD (Lab ID: 1608849)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 27, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Sample: LAO-SS-1-010914 **Lab ID: 10254828001** Collected: 01/09/14 12:15 Received: 01/14/14 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.0040	0.0015	1	01/15/14 13:01	01/27/14 10:25	7429-90-5	
Arsenic	**0.0036**	mg/L	0.00050	0.000093	1	01/15/14 13:01	01/27/14 10:25	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000032	1	01/15/14 13:01	01/27/14 10:25	7440-43-9	
Calcium	**118**	mg/L	0.50	0.24	25	01/15/14 13:01	01/27/14 10:49	7440-70-2	M1
Copper	**0.0055**	mg/L	0.00050	0.00017	1	01/15/14 13:01	01/27/14 10:25	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0059	1	01/15/14 13:01	01/27/14 10:25	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	01/15/14 13:01	01/27/14 10:25	7439-92-1	
Magnesium	**33.6**	mg/L	0.025	0.012	5	01/15/14 13:01	01/27/14 10:45	7439-95-4	M1
Silver	**0.000078J**	mg/L	0.00050	0.000050	1	01/15/14 13:01	01/27/14 10:25	7440-22-4	B,M1
Total Hardness by 2340B	**433**	mg/L	1.8	0.89	25	01/15/14 13:01	01/27/14 10:49		
Uranium-238	**0.0078**	mg/L	0.00050	0.00010	1	01/15/14 13:01	01/27/14 10:25	7440-61-1	
Zinc	**0.038**	mg/L	0.0050	0.00098	1	01/15/14 13:01	01/27/14 10:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/15/14 13:49	01/17/14 14:50	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Sample: LAO-SS-1-011314 **Lab ID: 10254828002** Collected: 01/13/14 14:14 Received: 01/14/14 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0036J**	mg/L	0.0040	0.0015	1	01/15/14 13:01	01/27/14 11:22	7429-90-5	
Arsenic	**0.0036**	mg/L	0.00050	0.000093	1	01/15/14 13:01	01/27/14 11:22	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000032	1	01/15/14 13:01	01/27/14 11:22	7440-43-9	
Calcium	**118**	mg/L	0.20	0.098	10	01/15/14 13:01	01/27/14 11:27	7440-70-2	
Copper	**0.0071**	mg/L	0.00050	0.00017	1	01/15/14 13:01	01/27/14 11:22	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	01/15/14 13:01	01/27/14 11:22	7439-89-6	
Lead	**0.00022**	mg/L	0.00010	0.000046	1	01/15/14 13:01	01/27/14 11:22	7439-92-1	
Magnesium	**33.7**	mg/L	0.050	0.024	10	01/15/14 13:01	01/27/14 11:27	7439-95-4	
Silver	**0.000095J**	mg/L	0.00050	0.000050	1	01/15/14 13:01	01/27/14 11:22	7440-22-4	B
Total Hardness by 2340B	**434**	mg/L	0.71	0.36	10	01/15/14 13:01	01/27/14 11:27		
Uranium-238	**0.0080**	mg/L	0.00050	0.00010	1	01/15/14 13:01	01/27/14 11:22	7440-61-1	
Zinc	**0.045**	mg/L	0.0050	0.00098	1	01/15/14 13:01	01/27/14 11:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/15/14 13:49	01/17/14 14:52	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Sample: LAO-SS-2-011314 **Lab ID: 10254828003** Collected: 01/13/14 15:00 Received: 01/14/14 11:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.17**	mg/L	0.0040	0.0015	1	01/15/14 13:01	01/27/14 10:54	7429-90-5	
Arsenic	**0.033**	mg/L	0.00050	0.000093	1	01/15/14 13:01	01/27/14 10:54	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000032	1	01/15/14 13:01	01/27/14 10:54	7440-43-9	
Calcium	**137**	mg/L	0.20	0.098	10	01/15/14 13:01	01/27/14 10:58	7440-70-2	
Copper	**0.75**	mg/L	0.0050	0.0017	10	01/15/14 13:01	01/27/14 10:58	7440-50-8	
Iron	**4.9**	mg/L	0.050	0.0059	1	01/15/14 13:01	01/27/14 10:54	7439-89-6	
Lead	**0.012**	mg/L	0.00010	0.000046	1	01/15/14 13:01	01/27/14 10:54	7439-92-1	
Magnesium	**39.0**	mg/L	0.050	0.024	10	01/15/14 13:01	01/27/14 10:58	7439-95-4	
Silver	**0.00010J**	mg/L	0.00050	0.000050	1	01/15/14 13:01	01/27/14 10:54	7440-22-4	B
Total Hardness by 2340B	**503**	mg/L	0.71	0.36	10	01/15/14 13:01	01/27/14 10:58		
Uranium-238	**0.014**	mg/L	0.00050	0.00010	1	01/15/14 13:01	01/27/14 10:54	7440-61-1	
Zinc	**4.9**	mg/L	0.50	0.098	100	01/15/14 13:01	01/27/14 11:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000076J**	mg/L	0.00020	0.000030	1	01/15/14 13:49	01/17/14 14:55	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

QC Batch: MERP/9926 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10254828001, 10254828002, 10254828003

METHOD BLANK: 1608855 Matrix: Water
Associated Lab Samples: 10254828001, 10254828002, 10254828003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	01/17/14 14:45	

LABORATORY CONTROL SAMPLE: 1608856

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0056	112	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1608857 1608858

Parameter	Units	10254828003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000076J	.005	.005	0.0053	0.0055	105	108	85-115	2	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

QC Batch: MPRP/44082 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10254828001, 10254828002, 10254828003

METHOD BLANK: 1608846 Matrix: Water
Associated Lab Samples: 10254828001, 10254828002, 10254828003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	01/27/14 10:21	
Arsenic	mg/L	ND	0.00050	01/27/14 10:21	
Cadmium	mg/L	ND	0.000080	01/27/14 10:21	
Calcium	mg/L	0.011J	0.020	01/27/14 10:21	
Copper	mg/L	ND	0.00050	01/27/14 10:21	
Iron	mg/L	ND	0.050	01/27/14 10:21	
Lead	mg/L	ND	0.00010	01/27/14 10:21	
Magnesium	mg/L	ND	0.0050	01/27/14 10:21	
Silver	mg/L	0.000056J	0.00050	01/27/14 10:21	
Uranium-238	mg/L	ND	0.00050	01/27/14 10:21	
Zinc	mg/L	ND	0.0050	01/27/14 10:21	

LABORATORY CONTROL SAMPLE: 1608847

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.075	94	85-115	
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.080	100	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.080	100	85-115	
Iron	mg/L	1	1.0	105	85-115	
Lead	mg/L	.08	0.079	99	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.078	98	85-115	
Uranium-238	mg/L	.08	0.081	102	85-115	
Zinc	mg/L	.08	0.079	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1608848 1608849

Parameter	Units	10254828001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	ND	.08	.08	0.075	0.080	92	99	70-130	7	20	
Arsenic	mg/L	0.0036	.08	.08	0.082	0.084	97	100	70-130	3	20	
Cadmium	mg/L	0.00014	.08	.08	0.076	0.078	95	97	70-130	2	20	
Calcium	mg/L	118	1	1	114	118	-378	-50	70-130	3	20	E,M1
Copper	mg/L	0.0055	.08	.08	0.080	0.091	93	107	70-130	13	20	
Iron	mg/L	0.017J	1	1	0.98	1.1	97	111	70-130	14	20	
Lead	mg/L	0.00016	.08	.08	0.074	0.076	92	95	70-130	3	20	
Magnesium	mg/L	33.6	1	1	33.2	34.2	-40	62	70-130	3	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1608848 1608849

Parameter	Units	10254828001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	0.000078J	.08	.08	0.024	0.025	30	31	70-130	4	20	M1
Uranium-238	mg/L	0.0078	.08	.08	0.083	0.085	94	97	70-130	3	20	
Zinc	mg/L	0.038	.08	.08	0.11	0.11	92	96	70-130	3	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10254828

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10254828001	**LAO-SS-1-010914**	EPA 200.8	MPRP/44082	EPA 200.8	ICPM/19008
10254828002	**LAO-SS-1-011314**	EPA 200.8	MPRP/44082	EPA 200.8	ICPM/19008
10254828003	**LAO-SS-2-011314**	EPA 200.8	MPRP/44082	EPA 200.8	ICPM/19008
10254828001	**LAO-SS-1-010914**	EPA 245.1	MERP/9926	EPA 245.1	MERC/11416
10254828002	**LAO-SS-1-011314**	EPA 245.1	MERP/9926	EPA 245.1	MERC/11416
10254828003	**LAO-SS-2-011314**	EPA 245.1	MERP/9926	EPA 245.1	MERC/11416

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Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** _____

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	LAO-SS-1-0109 14	1/9/14	12:15		X						2				X	X	001
	LAO-SS-1-011314	1/13/14	14:14		X						2				X	X	002
	LAO-SS-2-011314	1/13/14	15:00		X						1				X		003

Sampler's Name:	Thomas Hickey, CJ Kissell	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation / Date / Time
Sampler's Company:	Pioneer Technical Services	[signature] / Pioneer Tech	1/13/14	1545	[signature] Pace 1/14/13 1115
Shipment Method:	FedEx Ship Date: 1/13/14				
Shipment Tracking No:	8010 5778 6631				

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer

Project #: WO#: 10254828

10254828

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 8010 5778 6631

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.6 **Cooler Temp Corrected (°C):** 0.8 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** 1/14/13

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12) Per method, VOA pH is checked after analysis	☑ Yes ☑ Yes	☐ No ☐ No	☐ N/A ☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample # 2/2, #1, #2 1/1, #3 Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present? Trip Blank Custody Seals Present? Pace Trip Blank Lot # (if purchased):	☐ Yes ☐ Yes	☐ No ☐ No	☑ N/A ☑ N/A	15.

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1420	Temp: 0.6	Corrected Temp: 0.8	
Time:	put in cooler	1423	
Time:	Temp:	Corrected Temp:	

Project Manager Review: **Date:** 1/15/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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February 03, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10255482

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on January 21, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10255482

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10255482

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10255482001	**LAO-SS-1-011614**	Water	01/16/14 13:00	01/21/14 11:00
10255482002	**LAO-SS-1-012014**	Water	01/20/14 12:45	01/21/14 11:00
10255482003	**LAO-SS-2-012014**	Water	01/20/14 14:00	01/21/14 11:00
10255482004	**LAO-SS-2T-012014**	Water	01/20/14 14:00	01/21/14 11:00
10255482005	**LAO-SS-3-012014**	Water	01/20/14 12:18	01/21/14 11:00
10255482006	**LAO-SS-4-012014**	Water	01/20/14 14:15	01/21/14 11:00
10255482007	**LAO-SS-SBC-01-012014**	Water	01/20/14 12:39	01/21/14 11:00
10255482008	**LAO-SS-06F-012014**	Water	01/20/14 12:30	01/21/14 11:00
10255482009	**LAO-SS-06G-012014**	Water	01/20/14 12:25	01/21/14 11:00
10255482010	**LAO-SS-A2-012014**	Water	01/20/14 13:00	01/21/14 11:00
10255482011	**LAO-SS-A3-012014**	Water	01/20/14 12:55	01/21/14 11:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10255482

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10255482001	**LAO-SS-1-011614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10255482002	**LAO-SS-1-012014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10255482003	**LAO-SS-2-012014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10255482004	**LAO-SS-2T-012014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10255482005	**LAO-SS-3-012014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10255482006	**LAO-SS-4-012014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10255482007	**LAO-SS-SBC-01-012014**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10255482008	**LAO-SS-06F-012014**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10255482

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540D	AAD	1	PASI-M
10255482009	**LAO-SS-06G-012014**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10255482010	**LAO-SS-A2-012014**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10255482011	**LAO-SS-A3-012014**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 03, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44207

B: Analyte was detected in the associated method blank.

- BLANK for HBN 284594 [MPRP/442 (Lab ID: 1614125)
  - Silver
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44207

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10255482001,10255765005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1614127)
  - Calcium
  - Magnesium
  - Silver
- MS (Lab ID: 1614129)
  - Aluminum
  - Calcium
  - Silver

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 03, 2014

QC Batch: MPRP/44207

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10255482001,10255765005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1614128)
  - Calcium
  - Magnesium
  - Silver

Additional Comments:

Analyte Comments:

QC Batch: MPRP/44207

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1614127)
  - Calcium
- MS (Lab ID: 1614129)
  - Calcium
- MSD (Lab ID: 1614128)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: February 03, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: February 03, 2014

General Information:
10 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: February 03, 2014

General Information:
10 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: February 03, 2014

General Information:
10 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10255482

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: February 03, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17169

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10255321001,10255482002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1613912)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1613913)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-1-011614 **Lab ID: 10255482001** Collected: 01/16/14 13:00 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0025J**	mg/L	0.0040	0.0015	1	01/24/14 08:13	01/25/14 01:43	7429-90-5	
Arsenic	**0.0038**	mg/L	0.00050	0.000093	1	01/24/14 08:13	01/25/14 01:43	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000032	1	01/24/14 08:13	01/25/14 01:43	7440-43-9	
Calcium	**128**	mg/L	0.50	0.24	25	01/24/14 08:13	01/25/14 02:07	7440-70-2	M1
Copper	**0.0057**	mg/L	0.00050	0.00017	1	01/24/14 08:13	01/25/14 01:43	7440-50-8	
Iron	**0.012J**	mg/L	0.050	0.0059	1	01/24/14 08:13	01/25/14 01:43	7439-89-6	
Lead	**0.00012**	mg/L	0.00010	0.000046	1	01/24/14 08:13	01/25/14 01:43	7439-92-1	
Magnesium	**32.7**	mg/L	0.025	0.012	5	01/24/14 08:13	01/25/14 02:02	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	01/24/14 08:13	01/27/14 12:46	7440-22-4	M1
Total Hardness by 2340B	**454**	mg/L	1.8	0.89	25	01/24/14 08:13	01/25/14 02:07		
Uranium-238	**0.0070**	mg/L	0.00050	0.00010	1	01/24/14 08:13	01/25/14 01:43	7440-61-1	
Zinc	**0.037**	mg/L	0.0050	0.00098	1	01/24/14 08:13	01/25/14 01:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/27/14 11:41	01/28/14 15:17	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-1-012014 **Lab ID: 10255482002** Collected: 01/20/14 12:45 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.0040	0.0015	1	01/24/14 08:13	01/25/14 02:12	7429-90-5	
Arsenic	**0.0035**	mg/L	0.00050	0.000093	1	01/24/14 08:13	01/25/14 02:12	7440-38-2	
Cadmium	**0.00010**	mg/L	0.000080	0.000032	1	01/24/14 08:13	01/25/14 02:12	7440-43-9	
Calcium	**130**	mg/L	0.20	0.098	10	01/24/14 08:13	01/25/14 02:16	7440-70-2	
Copper	**0.0042**	mg/L	0.00050	0.00017	1	01/24/14 08:13	01/25/14 02:12	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	01/24/14 08:13	01/25/14 02:12	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	01/24/14 08:13	01/25/14 02:12	7439-92-1	
Magnesium	**36.4**	mg/L	0.050	0.024	10	01/24/14 08:13	01/25/14 02:16	7439-95-4	
Silver	**0.000068J**	mg/L	0.00050	0.000050	1	01/24/14 08:13	01/27/14 12:19	7440-22-4	B
Total Hardness by 2340B	**474**	mg/L	0.71	0.36	10	01/24/14 08:13	01/25/14 02:16		
Uranium-238	**0.0067**	mg/L	0.00050	0.00010	1	01/24/14 08:13	01/25/14 02:12	7440-61-1	
Zinc	**0.023**	mg/L	0.0050	0.00098	1	01/24/14 08:13	01/25/14 02:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/27/14 11:41	01/28/14 15:19	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**50.0**	mg/L	5.0	2.5	1		01/31/14 13:55		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**781**	mg/L	10.0	5.0	1		01/22/14 17:16		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		01/22/14 12:06		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.29**	mg/L	0.10	0.050	1		01/23/14 14:32		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-2-012014 **Lab ID: 10255482003** Collected: 01/20/14 14:00 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.080**	mg/L	0.0040	0.0015	1	01/24/14 08:13	01/25/14 02:50	7429-90-5	
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	01/24/14 08:13	01/25/14 02:50	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000032	1	01/24/14 08:13	01/25/14 02:50	7440-43-9	
Calcium	**144**	mg/L	0.20	0.098	10	01/24/14 08:13	01/25/14 02:54	7440-70-2	
Copper	**0.44**	mg/L	0.00050	0.00017	1	01/24/14 08:13	01/25/14 02:50	7440-50-8	
Iron	**3.0**	mg/L	0.050	0.0059	1	01/24/14 08:13	01/25/14 02:50	7439-89-6	
Lead	**0.0072**	mg/L	0.00010	0.000046	1	01/24/14 08:13	01/25/14 02:50	7439-92-1	
Magnesium	**35.9**	mg/L	0.050	0.024	10	01/24/14 08:13	01/25/14 02:54	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/24/14 08:13	01/27/14 12:24	7440-22-4	
Total Hardness by 2340B	**508**	mg/L	0.71	0.36	10	01/24/14 08:13	01/25/14 02:54		
Uranium-238	**0.011**	mg/L	0.00050	0.00010	1	01/24/14 08:13	01/25/14 02:50	7440-61-1	
Zinc	**5.1**	mg/L	0.25	0.049	50	01/24/14 08:13	01/27/14 12:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/27/14 11:41	01/28/14 15:22	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**109**	mg/L	5.0	2.5	1		01/31/14 14:11		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**853**	mg/L	10.0	5.0	1		01/22/14 17:17		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11.0**	mg/L	10.0	5.0	1		01/22/14 12:06		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.76**	mg/L	0.10	0.050	1		01/23/14 14:37		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-2T-012014 **Lab ID: 10255482004** Collected: 01/20/14 14:00 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.12**	mg/L	0.0040	0.0015	1	01/24/14 08:13	01/25/14 02:59	7429-90-5	
Arsenic	**0.030**	mg/L	0.00050	0.000093	1	01/24/14 08:13	01/25/14 02:59	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000032	1	01/24/14 08:13	01/25/14 02:59	7440-43-9	
Calcium	**143**	mg/L	0.20	0.098	10	01/24/14 08:13	01/25/14 03:03	7440-70-2	
Copper	**0.64**	mg/L	0.0050	0.0017	10	01/24/14 08:13	01/25/14 03:03	7440-50-8	
Iron	**3.8**	mg/L	0.050	0.0059	1	01/24/14 08:13	01/25/14 02:59	7439-89-6	
Lead	**0.010**	mg/L	0.00010	0.000046	1	01/24/14 08:13	01/25/14 02:59	7439-92-1	
Magnesium	**35.6**	mg/L	0.050	0.024	10	01/24/14 08:13	01/25/14 03:03	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/24/14 08:13	01/27/14 12:33	7440-22-4	
Total Hardness by 2340B	**504**	mg/L	0.71	0.36	10	01/24/14 08:13	01/25/14 03:03		
Uranium-238	**0.011**	mg/L	0.00050	0.00010	1	01/24/14 08:13	01/25/14 02:59	7440-61-1	
Zinc	**5.6**	mg/L	0.50	0.098	100	01/24/14 08:13	01/25/14 03:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/27/14 11:41	01/28/14 15:29	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**110**	mg/L	5.0	2.5	1		01/31/14 14:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**843**	mg/L	10.0	5.0	1		01/22/14 17:17		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**20.0**	mg/L	10.0	5.0	1		01/22/14 12:06		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.88**	mg/L	0.10	0.050	1		01/23/14 14:40		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-3-012014 **Lab ID: 10255482005** Collected: 01/20/14 12:18 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.36**	mg/L	0.0040	0.0015	1	01/24/14 08:13	01/25/14 03:12	7429-90-5	
Arsenic	**0.0051**	mg/L	0.00050	0.000093	1	01/24/14 08:13	01/25/14 03:12	7440-38-2	
Cadmium	**0.031**	mg/L	0.000080	0.000032	1	01/24/14 08:13	01/25/14 03:12	7440-43-9	
Calcium	**147**	mg/L	0.20	0.098	10	01/24/14 08:13	01/25/14 03:17	7440-70-2	
Copper	**1.8**	mg/L	0.0050	0.0017	10	01/24/14 08:13	01/25/14 03:17	7440-50-8	
Iron	**12.1**	mg/L	0.050	0.0059	1	01/24/14 08:13	01/25/14 03:12	7439-89-6	
Lead	**0.0015**	mg/L	0.00010	0.000046	1	01/24/14 08:13	01/25/14 03:12	7439-92-1	
Magnesium	**36.5**	mg/L	0.050	0.024	10	01/24/14 08:13	01/25/14 03:17	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/24/14 08:13	01/27/14 12:37	7440-22-4	
Total Hardness by 2340B	**518**	mg/L	0.71	0.36	10	01/24/14 08:13	01/25/14 03:17		
Uranium-238	**0.012**	mg/L	0.00050	0.00010	1	01/24/14 08:13	01/25/14 03:12	7440-61-1	
Zinc	**7.2**	mg/L	0.50	0.098	100	01/24/14 08:13	01/25/14 03:21	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/27/14 11:41	01/28/14 15:32	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**64.0**	mg/L	5.0	2.5	1		01/31/14 14:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**875**	mg/L	10.0	5.0	1		01/22/14 17:18		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**26.0**	mg/L	10.0	5.0	1		01/22/14 12:06		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.6**	mg/L	0.10	0.050	1		01/23/14 14:40		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-4-012014 **Lab ID: 10255482006** Collected: 01/20/14 14:15 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.010**	mg/L	0.0040	0.0015	1	01/24/14 08:13	01/25/14 02:41	7429-90-5	
Arsenic	**0.00014J**	mg/L	0.00050	0.000093	1	01/24/14 08:13	01/25/14 02:41	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000032	1	01/24/14 08:13	01/25/14 02:41	7440-43-9	
Calcium	**0.59**	mg/L	0.020	0.0098	1	01/24/14 08:13	01/25/14 02:41	7440-70-2	
Copper	**0.00021J**	mg/L	0.00050	0.00017	1	01/24/14 08:13	01/27/14 12:15	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	01/24/14 08:13	01/25/14 02:41	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	01/24/14 08:13	01/25/14 02:41	7439-92-1	
Magnesium	**0.068**	mg/L	0.0050	0.0024	1	01/24/14 08:13	01/25/14 02:41	7439-95-4	
Silver	**0.000060J**	mg/L	0.00050	0.000050	1	01/24/14 08:13	01/27/14 12:15	7440-22-4	B
Total Hardness by 2340B	**1.8**	mg/L	0.071	0.036	1	01/24/14 08:13	01/25/14 02:41		
Uranium-238	**0.00014J**	mg/L	0.00050	0.00010	1	01/24/14 08:13	01/25/14 02:41	7440-61-1	
Zinc	**0.0034J**	mg/L	0.0050	0.00098	1	01/24/14 08:13	01/25/14 02:41	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	01/27/14 11:41	01/28/14 15:34	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		01/31/14 14:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		01/22/14 17:18		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		01/22/14 12:07		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.085J**	mg/L	0.10	0.050	1		01/23/14 14:41		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-SBC-01-012014 **Lab ID: 10255482007** Collected: 01/20/14 12:39 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**104**	mg/L	5.0	2.5	1		01/31/14 15:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**243**	mg/L	10.0	5.0	1		01/22/14 15:07		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**22.0**	mg/L	10.0	5.0	1		01/22/14 12:07		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-06F-012014 **Lab ID: 10255482008** Collected: 01/20/14 12:30 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**94.6**	mg/L	5.0	2.5	1		01/31/14 15:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**335**	mg/L	10.0	5.0	1		01/24/14 12:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**20.0**	mg/L	10.0	5.0	1		01/22/14 12:07		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-06G-012014 **Lab ID: 10255482009** Collected: 01/20/14 12:25 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**98.4**	mg/L	5.0	2.5	1		01/31/14 15:22		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**333**	mg/L	10.0	5.0	1		01/24/14 12:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**29.0**	mg/L	10.0	5.0	1		01/22/14 12:07		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-A2-012014 **Lab ID: 10255482010** Collected: 01/20/14 13:00 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**51.3**	mg/L	5.0	2.5	1		01/31/14 15:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**780**	mg/L	10.0	5.0	1		01/24/14 12:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**9.0J**	mg/L	10.0	5.0	1		01/22/14 12:07		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10255482

Sample: LAO-SS-A3-012014 **Lab ID: 10255482011** Collected: 01/20/14 12:55 Received: 01/21/14 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**53.9**	mg/L	5.0	2.5	1		01/31/14 15:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**786**	mg/L	10.0	5.0	1		01/24/14 12:45		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		01/22/14 12:07		

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: MERP/9952 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10255482001, 10255482002, 10255482003, 10255482004, 10255482005, 10255482006

METHOD BLANK: 1615147 Matrix: Water
Associated Lab Samples: 10255482001, 10255482002, 10255482003, 10255482004, 10255482005, 10255482006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	01/28/14 15:12	

LABORATORY CONTROL SAMPLE: 1615148

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0056	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1615149 1615150

Parameter	Units	10255482006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0053	0.0050	107	100	85-115	7	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: MPRP/44207 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10255482001, 10255482002, 10255482003, 10255482004, 10255482005, 10255482006

METHOD BLANK: 1614125 Matrix: Water
Associated Lab Samples: 10255482001, 10255482002, 10255482003, 10255482004, 10255482005, 10255482006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	01/25/14 01:38	
Arsenic	mg/L	ND	0.00050	01/25/14 01:38	
Cadmium	mg/L	ND	0.000080	01/25/14 01:38	
Calcium	mg/L	0.013J	0.020	01/25/14 01:38	
Copper	mg/L	ND	0.00050	01/27/14 12:10	
Iron	mg/L	ND	0.050	01/25/14 01:38	
Lead	mg/L	ND	0.00010	01/25/14 01:38	
Magnesium	mg/L	0.0032J	0.0050	01/25/14 01:38	
Silver	mg/L	0.000069J	0.00050	01/27/14 12:10	
Uranium-238	mg/L	ND	0.00050	01/25/14 01:38	
Zinc	mg/L	0.0019J	0.0050	01/25/14 01:38	

LABORATORY CONTROL SAMPLE: 1614126

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.083	104	85-115	
Cadmium	mg/L	.08	0.082	103	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Iron	mg/L	1	1.0	104	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.0	104	85-115	
Silver	mg/L	.08	0.080	100	85-115	
Uranium-238	mg/L	.08	0.085	107	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1614127 1614128

Parameter	Units	10255482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0025J	.08	.08	0.087	0.084	106	102	70-130	3	20	
Arsenic	mg/L	0.0038	.08	.08	0.089	0.087	106	104	70-130	2	20	
Cadmium	mg/L	0.00013	.08	.08	0.082	0.080	102	100	70-130	2	20	
Calcium	mg/L	128	1	1	131	128	326	2	70-130	2	20	E,M1
Copper	mg/L	0.0057	.08	.08	0.085	0.088	100	103	70-130	3	20	
Iron	mg/L	0.012J	1	1	1.0	1.0	104	102	70-130	2	20	
Lead	mg/L	0.00012	.08	.08	0.081	0.080	102	100	70-130	2	20	
Magnesium	mg/L	32.7	1	1	35.4	34.5	269	177	70-130	3	20	M1
Silver	mg/L	ND	.08	.08	0.027	0.027	33	33	70-130	.7	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1614127 1614128

Parameter	Units	10255482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0070	.08	.08	0.080	0.077	91	88	70-130	3	20	
Zinc	mg/L	0.037	.08	.08	0.12	0.12	103	99	70-130	2	20	

MATRIX SPIKE SAMPLE: 1614129

Parameter	Units	10255765005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.49	.08	0.70	268	70-130	M1
Arsenic	mg/L	0.0053	.08	0.087	102	70-130	
Cadmium	mg/L	0.00026	.08	0.081	102	70-130	
Calcium	mg/L	63000 ug/L	1	62.8	-24	70-130	E,M1
Copper	mg/L	0.020	.08	0.099	99	70-130	
Iron	mg/L	0.94	1	2.0	101	70-130	
Lead	mg/L	0.0083	.08	0.089	101	70-130	
Magnesium	mg/L	15100 ug/L	1	16.0	95	70-130	
Silver	mg/L	ND	.08	0.051	64	70-130	M1
Uranium-238	mg/L	5.6 ug/L	.08	0.075	87	70-130	
Zinc	mg/L	0.067	.08	0.15	104	70-130	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: WET/34185 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006, 10255482007, 10255482008, 10255482009, 10255482010, 10255482011

METHOD BLANK: 1617742 | Matrix: Water
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006, 10255482007, 10255482008, 10255482009, 10255482010, 10255482011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	01/31/14 13:44	

LABORATORY CONTROL SAMPLE & LCSD: 1617743 1617744

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.8	41.1	102	103	90-110	.7	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1617745 1617746

Parameter	Units	10255482002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	50.0	40	40	91.0	89.5	103	99	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1617747 1617748

Parameter	Units	10256221001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	5.9	40	40	45.1	46.0	98	100	80-120	2	30	

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: WET/34072 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006, 10255482007

METHOD BLANK: 1613198 Matrix: Water
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006, 10255482007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	5.0J	10.0	01/22/14 17:14	

LABORATORY CONTROL SAMPLE: 1613199

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	974	97	80-120	

SAMPLE DUPLICATE: 1613200

Parameter	Units	10255482007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	243	238	2	10	

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: WET/34090 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10255482008, 10255482009, 10255482010, 10255482011

METHOD BLANK: 1614214 Matrix: Water
Associated Lab Samples: 10255482008, 10255482009, 10255482010, 10255482011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	01/24/14 12:44	

LABORATORY CONTROL SAMPLE: 1614215

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	968	97	80-120	

SAMPLE DUPLICATE: 1614216

Parameter	Units	10255482011 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	786	787	.1	10	

SAMPLE DUPLICATE: 1614217

Parameter	Units	10255765013 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	198	195	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: WET/34073 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006, 10255482007, 10255482008, 10255482009, 10255482010, 10255482011

METHOD BLANK: 1613210 | Matrix: Water
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006, 10255482007, 10255482008, 10255482009, 10255482010, 10255482011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	01/22/14 12:06	

LABORATORY CONTROL SAMPLE: 1613211

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94.0	94	80-120	

SAMPLE DUPLICATE: 1613212

Parameter	Units	10255380001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1613213

Parameter	Units	10255482009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	29.0	30.0	3	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10255482

QC Batch: WETA/17169 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006

METHOD BLANK: 1613908 | Matrix: Water
Associated Lab Samples: 10255482002, 10255482003, 10255482004, 10255482005, 10255482006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	01/23/14 14:07	

LABORATORY CONTROL SAMPLE: 1613909

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1613910 1613911

Parameter	Units	10255321001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.3	2.5	2.5	3.5	3.6	89	92	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1613912 1613913

Parameter	Units	10255482002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.29	2.5	2.5	0.74	0.68	18	16	80-120	7	30	M1

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10255482

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10255482

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10255482001	**LAO-SS-1-011614**	EPA 200.8	MPRP/44207	EPA 200.8	ICPM/19077
10255482002	**LAO-SS-1-012014**	EPA 200.8	MPRP/44207	EPA 200.8	ICPM/19077
10255482003	**LAO-SS-2-012014**	EPA 200.8	MPRP/44207	EPA 200.8	ICPM/19077
10255482004	**LAO-SS-2T-012014**	EPA 200.8	MPRP/44207	EPA 200.8	ICPM/19077
10255482005	**LAO-SS-3-012014**	EPA 200.8	MPRP/44207	EPA 200.8	ICPM/19077
10255482006	**LAO-SS-4-012014**	EPA 200.8	MPRP/44207	EPA 200.8	ICPM/19077
10255482001	**LAO-SS-1-011614**	EPA 245.1	MERP/9952	EPA 245.1	MERC/11452
10255482002	**LAO-SS-1-012014**	EPA 245.1	MERP/9952	EPA 245.1	MERC/11452
10255482003	**LAO-SS-2-012014**	EPA 245.1	MERP/9952	EPA 245.1	MERC/11452
10255482004	**LAO-SS-2T-012014**	EPA 245.1	MERP/9952	EPA 245.1	MERC/11452
10255482005	**LAO-SS-3-012014**	EPA 245.1	MERP/9952	EPA 245.1	MERC/11452
10255482006	**LAO-SS-4-012014**	EPA 245.1	MERP/9952	EPA 245.1	MERC/11452
10255482002	**LAO-SS-1-012014**	SM 2320B	WET/34185		
10255482003	**LAO-SS-2-012014**	SM 2320B	WET/34185		
10255482004	**LAO-SS-2T-012014**	SM 2320B	WET/34185		
10255482005	**LAO-SS-3-012014**	SM 2320B	WET/34185		
10255482006	**LAO-SS-4-012014**	SM 2320B	WET/34185		
10255482007	**LAO-SS-SBC-01-012014**	SM 2320B	WET/34185		
10255482008	**LAO-SS-06F-012014**	SM 2320B	WET/34185		
10255482009	**LAO-SS-06G-012014**	SM 2320B	WET/34185		
10255482010	**LAO-SS-A2-012014**	SM 2320B	WET/34185		
10255482011	**LAO-SS-A3-012014**	SM 2320B	WET/34185		
10255482002	**LAO-SS-1-012014**	SM 2540C	WET/34072		
10255482003	**LAO-SS-2-012014**	SM 2540C	WET/34072		
10255482004	**LAO-SS-2T-012014**	SM 2540C	WET/34072		
10255482005	**LAO-SS-3-012014**	SM 2540C	WET/34072		
10255482006	**LAO-SS-4-012014**	SM 2540C	WET/34072		
10255482007	**LAO-SS-SBC-01-012014**	SM 2540C	WET/34072		
10255482008	**LAO-SS-06F-012014**	SM 2540C	WET/34090		
10255482009	**LAO-SS-06G-012014**	SM 2540C	WET/34090		
10255482010	**LAO-SS-A2-012014**	SM 2540C	WET/34090		
10255482011	**LAO-SS-A3-012014**	SM 2540C	WET/34090		
10255482002	**LAO-SS-1-012014**	SM 2540D	WET/34073		
10255482003	**LAO-SS-2-012014**	SM 2540D	WET/34073		
10255482004	**LAO-SS-2T-012014**	SM 2540D	WET/34073		
10255482005	**LAO-SS-3-012014**	SM 2540D	WET/34073		
10255482006	**LAO-SS-4-012014**	SM 2540D	WET/34073		
10255482007	**LAO-SS-SBC-01-012014**	SM 2540D	WET/34073		
10255482008	**LAO-SS-06F-012014**	SM 2540D	WET/34073		
10255482009	**LAO-SS-06G-012014**	SM 2540D	WET/34073		
10255482010	**LAO-SS-A2-012014**	SM 2540D	WET/34073		
10255482011	**LAO-SS-A3-012014**	SM 2540D	WET/34073		
10255482002	**LAO-SS-1-012014**	SM 4500-NO3 H	WETA/17169		
10255482003	**LAO-SS-2-012014**	SM 4500-NO3 H	WETA/17169		
10255482004	**LAO-SS-2T-012014**	SM 4500-NO3 H	WETA/17169		
10255482005	**LAO-SS-3-012014**	SM 4500-NO3 H	WETA/17169		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10255482

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10255482006	**LAO-SS-4-012014**	SM 4500-NO3 H	WETA/17169		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1/31, 1134

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** 10/25/14 **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:**

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hansen

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Alkalinity, TDS, TSS	NO2/NO3						Comments
	LAO-SS-1-011614	1/16/14	1300		X			2			2				X			X								001
	LAO-SS-1-012014	1/20/14	12:45		X			4	1	1	2				X			X	X	X						002
	LAO-SS-2-012014	1/20/14	1400		X			3	1	1	1				X				X	X						003
	LAO-SS-2T-012014	1/20/14	1400		X			3	1	1	1				X				X	X						004
	LAO-SS-3-012014	1/20/14	12:18		X			3	1	1	1				X				X	X						005
	LAO-SS-4-012014	1/20/14	14:15		X			3	1	1	1				X				X	X						006
	LAO-SS-SBC-01-012014	1/20/14	12:39		X			1	1										X							007
	LAO-SS-06F-012014	1/20/14	12:30		X			1	1										X							008
	LAO-SS-066-012014	1/20/14	12:25		X			1	1										X							009
	LAO-SS-A2-012014	1/20/14	1300		X			1	1										X							010

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey, CJ Kissell						
Sampler's Company: Pioneer Technical Services	[signature] /PTS	1/20/14	1500	SUH/Pace	1/21/14	11:00
Shipment Method: Fed Ex Ship Date: 1/20/14						
Shipment Tracking No: 8010 5778 6642						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

1134

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) Lab Work Order Number: _____

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hanson

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Alkalinity, TDS, TSS						Comments
	~~LAO-SS-1~~				X			0			2				X			X								
	~~LAO-SS-1~~				X			0			2				X			X								
	~~LAO-SS-2~~				X			0			1				X											
	LAO-SS-A3-012014	1/20/14	12:55		X			1											X							OIL

Sampler's Name: Thomas Hickey, CJ Kissell	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] / PTS	1/20/14	1500	SUH / Pace	1/21/14	11:00
Shipment Method: FedEx Ship Date: 1/20/14						
Shipment Tracking No: 8010 5778 6642						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO# : 10255482

10255482

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 8010 5778 6042

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.2 **Cooler Temp Corrected (°C):** 1.9 **Biological Tissue Frozen?** ☐ Yes ☑ No

Temp should be above freezing to 6°C **Correction Factor:** +0.7 **Date and Initials of Person Examining Contents:** 1/21/14 SLA

Comments:

				Comments
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? JTT 1/21/14	☑ Yes	☐ No	☑ N/A	11.
Sample Labels Match COC? SLA 1/21/14	☑ Yes	☑ No	☐ N/A	12. Time on sample #1 shows 1315 on samples & 1300 on COC
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☑ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # Samples #1-2: 2/2 Samples #3-6: 1/1 Samples #2-6: 1/1
Per method, VOA pH is checked after analysis				Initial when completed: SLA Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 12:58	Temp: 1.2	Corrected Temp: 1.9	
Time: 1:15	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: Date: 1/22/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

February 10, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on January 28, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10256165001	**LAO-SS-1-012314**	Water	01/23/14 14:15	01/28/14 10:07
10256165002	**LAO-SS-1-012714**	Water	01/27/14 13:30	01/28/14 10:07
10256165003	**LAO-SS-2-012714**	Water	01/27/14 13:40	01/28/14 10:07

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10256165001	**LAO-SS-1-012314**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
10256165002	**LAO-SS-1-012714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
10256165003	**LAO-SS-2-012714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 10, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44288

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10256165001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1617643)
  - Calcium
  - Silver
- MSD (Lab ID: 1617644)
  - Calcium
  - Magnesium
  - Silver

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 10, 2014

Analyte Comments:

QC Batch: MPRP/44288

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1617643)
  - Calcium
- MSD (Lab ID: 1617644)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: February 10, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Sample: LAO-SS-1-012314 **Lab ID: 10256165001** Collected: 01/23/14 14:15 Received: 01/28/14 10:07 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0045**	mg/L	0.0040	0.0015	1	01/31/14 08:05	02/04/14 09:07	7429-90-5	
Arsenic	**0.0039**	mg/L	0.00050	0.000093	1	01/31/14 08:05	02/04/14 09:07	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000032	1	01/31/14 08:05	02/04/14 09:07	7440-43-9	
Calcium	**127**	mg/L	0.40	0.20	20	01/31/14 08:05	02/04/14 09:17	7440-70-2	M1
Copper	**0.0071**	mg/L	0.00050	0.00017	1	01/31/14 08:05	02/04/14 09:07	7440-50-8	
Iron	**0.015J**	mg/L	0.050	0.0059	1	01/31/14 08:05	02/04/14 09:07	7439-89-6	
Lead	**0.00019**	mg/L	0.00010	0.000046	1	01/31/14 08:05	02/04/14 09:07	7439-92-1	
Magnesium	**37.1**	mg/L	0.10	0.048	20	01/31/14 08:05	02/04/14 09:17	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	01/31/14 08:05	02/04/14 09:07	7440-22-4	M1
Total Hardness by 2340B	**470**	mg/L	1.4	0.71	20	01/31/14 08:05	02/04/14 09:17		
Uranium-238	**0.0076**	mg/L	0.00050	0.00010	1	01/31/14 08:05	02/04/14 09:07	7440-61-1	
Zinc	**0.045**	mg/L	0.0050	0.00098	1	01/31/14 08:05	02/04/14 09:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/06/14 14:46	02/07/14 13:54	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Sample: LAO-SS-1-012714 **Lab ID: 10256165002** Collected: 01/27/14 13:30 Received: 01/28/14 10:07 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0027J**	mg/L	0.0040	0.0015	1	01/31/14 08:05	02/04/14 09:22	7429-90-5	
Arsenic	**0.0037**	mg/L	0.00050	0.000093	1	01/31/14 08:05	02/04/14 09:22	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000032	1	01/31/14 08:05	02/04/14 09:22	7440-43-9	
Calcium	**131**	mg/L	0.40	0.20	20	01/31/14 08:05	02/04/14 09:26	7440-70-2	
Copper	**0.0069**	mg/L	0.00050	0.00017	1	01/31/14 08:05	02/04/14 09:22	7440-50-8	
Iron	**0.018J**	mg/L	0.050	0.0059	1	01/31/14 08:05	02/04/14 09:22	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	01/31/14 08:05	02/04/14 09:22	7439-92-1	
Magnesium	**37.1**	mg/L	0.10	0.048	20	01/31/14 08:05	02/04/14 09:26	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/31/14 08:05	02/04/14 09:22	7440-22-4	
Total Hardness by 2340B	**481**	mg/L	1.4	0.71	20	01/31/14 08:05	02/04/14 09:26		
Uranium-238	**0.0077**	mg/L	0.00050	0.00010	1	01/31/14 08:05	02/04/14 09:22	7440-61-1	
Zinc	**0.049**	mg/L	0.0050	0.00098	1	01/31/14 08:05	02/04/14 09:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/06/14 14:46	02/07/14 13:56	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Sample: LAO-SS-2-012714 **Lab ID: 10256165003** Collected: 01/27/14 13:40 Received: 01/28/14 10:07 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.090**	mg/L	0.0040	0.0015	1	01/31/14 08:05	02/04/14 09:32	7429-90-5	
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	01/31/14 08:05	02/04/14 09:32	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000032	1	01/31/14 08:05	02/04/14 09:32	7440-43-9	
Calcium	**146**	mg/L	0.40	0.20	20	01/31/14 08:05	02/04/14 09:37	7440-70-2	
Copper	**0.53**	mg/L	0.010	0.0035	20	01/31/14 08:05	02/04/14 09:37	7440-50-8	
Iron	**3.2**	mg/L	0.050	0.0059	1	01/31/14 08:05	02/04/14 09:32	7439-89-6	
Lead	**0.0099**	mg/L	0.00010	0.000046	1	01/31/14 08:05	02/04/14 09:32	7439-92-1	
Magnesium	**37.9**	mg/L	0.10	0.048	20	01/31/14 08:05	02/04/14 09:37	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	01/31/14 08:05	02/04/14 09:32	7440-22-4	
Total Hardness by 2340B	**521**	mg/L	1.4	0.71	20	01/31/14 08:05	02/04/14 09:37		
Uranium-238	**0.013**	mg/L	0.00050	0.00010	1	01/31/14 08:05	02/04/14 09:32	7440-61-1	
Zinc	**5.9**	mg/L	0.10	0.020	20	01/31/14 08:05	02/04/14 09:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/06/14 14:46	02/07/14 14:04	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

QC Batch: MERP/10003 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10256165001, 10256165002, 10256165003

METHOD BLANK: 1620361 Matrix: Water
Associated Lab Samples: 10256165001, 10256165002, 10256165003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	02/07/14 13:49	

LABORATORY CONTROL SAMPLE: 1620362

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1620363 1620364

Parameter	Units	10256165002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0046	0.0048	93	96	85-115	4	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

QC Batch: MPRP/44288 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10256165001, 10256165002, 10256165003

METHOD BLANK: 1617641 Matrix: Water
Associated Lab Samples: 10256165001, 10256165002, 10256165003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	02/04/14 09:01	
Arsenic	mg/L	ND	0.00050	02/04/14 09:01	
Cadmium	mg/L	ND	0.000080	02/04/14 09:01	
Calcium	mg/L	ND	0.020	02/04/14 09:01	
Copper	mg/L	ND	0.00050	02/04/14 09:01	
Iron	mg/L	ND	0.050	02/04/14 09:01	
Lead	mg/L	ND	0.00010	02/04/14 09:01	
Magnesium	mg/L	ND	0.0050	02/04/14 09:01	
Silver	mg/L	ND	0.00050	02/04/14 09:01	
Uranium-238	mg/L	ND	0.00050	02/04/14 09:01	
Zinc	mg/L	0.0018J	0.0050	02/04/14 09:01	

LABORATORY CONTROL SAMPLE: 1617642

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	106	85-115	
Arsenic	mg/L	.08	0.085	106	85-115	
Cadmium	mg/L	.08	0.085	106	85-115	
Calcium	mg/L	1	1.1	105	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.1	106	85-115	
Lead	mg/L	.08	0.090	113	85-115	
Magnesium	mg/L	1	1.1	108	85-115	
Silver	mg/L	.08	0.082	102	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.088	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1617643 1617644

Parameter	Units	10256165001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0045	.08	.08	0.088	0.086	104	101	70-130	3	20	
Arsenic	mg/L	0.0039	.08	.08	0.090	0.087	107	104	70-130	3	20	
Cadmium	mg/L	0.00014	.08	.08	0.085	0.082	106	103	70-130	3	20	
Calcium	mg/L	127	1	1	129	126	159	-121	70-130	2	20	E,M1
Copper	mg/L	0.0071	.08	.08	0.089	0.087	102	100	70-130	2	20	
Iron	mg/L	0.015J	1	1	1.0	1.0	102	101	70-130	1	20	
Lead	mg/L	0.00019	.08	.08	0.087	0.085	109	106	70-130	2	20	
Magnesium	mg/L	37.1	1	1	38.1	37.3	97	16	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.017	0.020	21	26	70-130	19	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1617643 1617644

Parameter	Units	10256165001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0076	.08	.08	0.086	0.084	98	95	70-130	2	20	
Zinc	mg/L	0.045	.08	.08	0.13	0.13	108	104	70-130	3	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10256165

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10256165001	**LAO-SS-1-012314**	EPA 200.8	MPRP/44288	EPA 200.8	ICPM/19142
10256165002	**LAO-SS-1-012714**	EPA 200.8	MPRP/44288	EPA 200.8	ICPM/19142
10256165003	**LAO-SS-2-012714**	EPA 200.8	MPRP/44288	EPA 200.8	ICPM/19142
10256165001	**LAO-SS-1-012314**	EPA 245.1	MERP/10003	EPA 245.1	MERC/11504
10256165002	**LAO-SS-1-012714**	EPA 245.1	MERP/10003	EPA 245.1	MERC/11504
10256165003	**LAO-SS-2-012714**	EPA 245.1	MERP/10003	EPA 245.1	MERC/11504

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1128

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 10256165

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-012314	1/23/14	1415		X						2				X	X	10256165 001
	LAO-SS-1-012714	1/27/14	1330		X						2				X	X	002
	LAO-SS-2-012714	1/27/14	1340		X						1				X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: CJ Kessell

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 1/27/14

Shipment Tracking No: 8010 5778 6712

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
CJ / PTS	1/27/14	1445	Pace	1/28/14	1007

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

CMB 1/28/14

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer

Project #: WO# : 10256165

10256165

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: 801055778 0712

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other:_____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.3 **Cooler Temp Corrected (°C):** 3.0 **Biological Tissue Frozen?** ☐ Yes ☒ No

Temp should be above freezing to 6°C **Correction Factor:** +0.7 **Date and Initials of Person Examining Contents:** CMB 1/28/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-3 5 15
Per method, VOA pH is checked after analysis				Initial when completed: CMB Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 10:10	Temp: 3.0	Corrected Temp:
Time: 10:19	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 1/29/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

February 10, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10256732

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on February 04, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10256732

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10256732

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10256732001	**LAO-SS-1-013014**	Water	01/30/14 12:00	02/04/14 09:38
10256732002	**LAO-SS-1-020314**	Water	02/03/14 13:57	02/04/14 09:38
10256732003	**LAO-SS-2-020314**	Water	02/03/14 14:30	02/04/14 09:38

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10256732

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10256732001	**LAO-SS-1-013014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	BT	1	PASI-M
10256732002	**LAO-SS-1-020314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	BT	1	PASI-M
10256732003	**LAO-SS-2-020314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	BT	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10256732

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 10, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44343

B: Analyte was detected in the associated method blank.

- BLANK for HBN 285822 [MPRP/443 (Lab ID: 1619750)
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44343

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10256732001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1619752)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1619753)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10256732

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 10, 2014

Analyte Comments:

QC Batch: MPRP/44343

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1619752)
  - Calcium
- MSD (Lab ID: 1619753)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10256732

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: February 10, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10256732

Sample: LAO-SS-1-013014 **Lab ID: 10256732001** Collected: 01/30/14 12:00 Received: 02/04/14 09:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.014**	mg/L	0.0040	0.0015	1	02/06/14 08:17	02/06/14 16:08	7429-90-5	
Arsenic	**0.0035**	mg/L	0.00050	0.000093	1	02/06/14 08:17	02/06/14 16:08	7440-38-2	
Cadmium	**0.00023**	mg/L	0.000080	0.000032	1	02/06/14 08:17	02/06/14 16:08	7440-43-9	
Calcium	**123**	mg/L	0.50	0.24	25	02/06/14 08:17	02/06/14 16:37	7440-70-2	M1
Copper	**0.0082**	mg/L	0.00050	0.00017	1	02/06/14 08:17	02/06/14 16:08	7440-50-8	
Iron	**0.035J**	mg/L	0.050	0.0059	1	02/06/14 08:17	02/06/14 16:08	7439-89-6	
Lead	**0.00054**	mg/L	0.00010	0.000046	1	02/06/14 08:17	02/06/14 16:08	7439-92-1	
Magnesium	**34.2**	mg/L	0.025	0.012	5	02/06/14 08:17	02/06/14 16:32	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	02/06/14 08:17	02/06/14 16:08	7440-22-4	
Total Hardness by 2340B	**448**	mg/L	1.8	0.89	25	02/06/14 08:17	02/06/14 16:37		
Uranium-238	**0.0079**	mg/L	0.00050	0.00010	1	02/06/14 08:17	02/06/14 16:08	7440-61-1	
Zinc	**0.061**	mg/L	0.0050	0.00098	1	02/06/14 08:17	02/06/14 16:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/06/14 14:46	02/07/14 14:06	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10256732

Sample: LAO-SS-1-020314 **Lab ID: 10256732002** Collected: 02/03/14 13:57 Received: 02/04/14 09:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.013**	mg/L	0.0040	0.0015	1	02/06/14 08:17	02/06/14 16:42	7429-90-5	
Arsenic	**0.0034**	mg/L	0.00050	0.000093	1	02/06/14 08:17	02/06/14 16:42	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000032	1	02/06/14 08:17	02/06/14 16:42	7440-43-9	
Calcium	**119**	mg/L	0.20	0.098	10	02/06/14 08:17	02/06/14 16:46	7440-70-2	
Copper	**0.0083**	mg/L	0.00050	0.00017	1	02/06/14 08:17	02/06/14 16:42	7440-50-8	
Iron	**0.031J**	mg/L	0.050	0.0059	1	02/06/14 08:17	02/06/14 16:42	7439-89-6	
Lead	**0.00047**	mg/L	0.00010	0.000046	1	02/06/14 08:17	02/06/14 16:42	7439-92-1	
Magnesium	**35.1**	mg/L	0.050	0.024	10	02/06/14 08:17	02/06/14 16:46	7439-95-4	
Silver	**0.00014J**	mg/L	0.00050	0.000050	1	02/06/14 08:17	02/06/14 16:42	7440-22-4	B
Total Hardness by 2340B	**442**	mg/L	0.71	0.36	10	02/06/14 08:17	02/06/14 16:46		
Uranium-238	**0.0081**	mg/L	0.00050	0.00010	1	02/06/14 08:17	02/06/14 16:42	7440-61-1	
Zinc	**0.057**	mg/L	0.0050	0.00098	1	02/06/14 08:17	02/06/14 16:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/06/14 14:46	02/07/14 14:09	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10256732

Sample: LAO-SS-2-020314 **Lab ID: 10256732003** Collected: 02/03/14 14:30 Received: 02/04/14 09:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.10**	mg/L	0.0040	0.0015	1	02/06/14 08:17	02/06/14 17:06	7429-90-5	
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	02/06/14 08:17	02/06/14 17:06	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000032	1	02/06/14 08:17	02/06/14 17:06	7440-43-9	
Calcium	**137**	mg/L	0.20	0.098	10	02/06/14 08:17	02/06/14 17:10	7440-70-2	
Copper	**0.50**	mg/L	0.0050	0.0017	10	02/06/14 08:17	02/06/14 17:10	7440-50-8	
Iron	**3.3**	mg/L	0.050	0.0059	1	02/06/14 08:17	02/06/14 17:06	7439-89-6	
Lead	**0.0090**	mg/L	0.00010	0.000046	1	02/06/14 08:17	02/06/14 17:06	7439-92-1	
Magnesium	**36.6**	mg/L	0.050	0.024	10	02/06/14 08:17	02/06/14 17:10	7439-95-4	
Silver	**0.00016J**	mg/L	0.00050	0.000050	1	02/06/14 08:17	02/06/14 17:06	7440-22-4	B
Total Hardness by 2340B	**492**	mg/L	0.71	0.36	10	02/06/14 08:17	02/06/14 17:10		
Uranium-238	**0.014**	mg/L	0.00050	0.00010	1	02/06/14 08:17	02/06/14 17:06	7440-61-1	
Zinc	**5.2**	mg/L	0.50	0.098	100	02/06/14 08:17	02/06/14 17:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/06/14 14:46	02/07/14 14:11	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10256732

QC Batch: MERP/10003 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10256732001, 10256732002, 10256732003

METHOD BLANK: 1620361 Matrix: Water
Associated Lab Samples: 10256732001, 10256732002, 10256732003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	02/07/14 13:49	

LABORATORY CONTROL SAMPLE: 1620362

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1620363 1620364

Parameter	Units	10256165002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0046	0.0048	93	96	85-115	4	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10256732

QC Batch: MPRP/44343 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10256732001, 10256732002, 10256732003

METHOD BLANK: 1619750 Matrix: Water
Associated Lab Samples: 10256732001, 10256732002, 10256732003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	02/06/14 16:04	
Arsenic	mg/L	ND	0.00050	02/06/14 16:04	
Cadmium	mg/L	ND	0.000080	02/06/14 16:04	
Calcium	mg/L	ND	0.020	02/06/14 16:04	
Copper	mg/L	ND	0.00050	02/06/14 16:04	
Iron	mg/L	ND	0.050	02/06/14 16:04	
Lead	mg/L	ND	0.00010	02/06/14 16:04	
Magnesium	mg/L	ND	0.0050	02/06/14 16:04	
Silver	mg/L	0.000082J	0.00050	02/06/14 16:04	
Uranium-238	mg/L	ND	0.00050	02/06/14 16:04	
Zinc	mg/L	ND	0.0050	02/06/14 16:04	

LABORATORY CONTROL SAMPLE: 1619751

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.077	96	85-115	
Cadmium	mg/L	.08	0.077	97	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.074	92	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.077	97	85-115	
Magnesium	mg/L	1	1.0	101	85-115	
Silver	mg/L	.08	0.078	97	85-115	
Uranium-238	mg/L	.08	0.079	99	85-115	
Zinc	mg/L	.08	0.079	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1619752 1619753

Parameter	Units	10256732001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.014	.08	.08	0.10	0.098	111	105	70-130	4	20	
Arsenic	mg/L	0.0035	.08	.08	0.083	0.081	100	97	70-130	3	20	
Cadmium	mg/L	0.00023	.08	.08	0.078	0.076	97	94	70-130	3	20	
Calcium	mg/L	123	1	1	123	121	28	-220	70-130	2	20	E,M1
Copper	mg/L	0.0082	.08	.08	0.082	0.089	92	101	70-130	9	20	
Iron	mg/L	0.035J	1	1	1.0	1.0	99	97	70-130	2	20	
Lead	mg/L	0.00054	.08	.08	0.078	0.076	96	95	70-130	2	20	
Magnesium	mg/L	34.2	1	1	35.9	35.3	174	116	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.070	0.066	88	82	70-130	6	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10256732

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1619752 1619753

Parameter	Units	10256732001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0079	.08	.08	0.087	0.085	98	96	70-130	2	20	
Zinc	mg/L	0.061	.08	.08	0.14	0.14	105	101	70-130	2	20	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10256732

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10256732

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10256732001	**LAO-SS-1-013014**	EPA 200.8	MPRP/44343	EPA 200.8	ICPM/19164
10256732002	**LAO-SS-1-020314**	EPA 200.8	MPRP/44343	EPA 200.8	ICPM/19164
10256732003	**LAO-SS-2-020314**	EPA 200.8	MPRP/44343	EPA 200.8	ICPM/19164
10256732001	**LAO-SS-1-013014**	EPA 245.1	MERP/10003	EPA 245.1	MERC/11504
10256732002	**LAO-SS-1-020314**	EPA 245.1	MERP/10003	EPA 245.1	MERC/11504
10256732003	**LAO-SS-2-020314**	EPA 245.1	MERP/10003	EPA 245.1	MERC/11504

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1130

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy):

Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 10256732

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 -013014	1/30/14	1200		X			2			2				X			X							10256732001
	LAO-SS-1 -020314	2/3/14	13:57		X			2			2				X			X							002
	LAO-SS-2 -020314	2/3/14	1430		X			1			1				X										003

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey, DJ Renz						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	2/3/14	1530	[signature] Pace	2/4/14	9:38
Shipment Method: Fedex Ship Date: 2/3/14						
Shipment Tracking No: 8010 9778 6701						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.7 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Silver Bow

Project #: WO#: 10256732

10256732

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 8010 5778 6701

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.7 **Cooler Temp Corrected (°C):** 2.7 **Biological Tissue Frozen?** ☐ Yes ☒ No

Temp should be above freezing to 6°C **Correction Factor:** TRUE **Date and Initials of Person Examining Contents:** CMB 2/4/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☐ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 1-3 5/5
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 11:30	Temp: 2.7	Corrected Temp: 2.7
Time: 1130	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 2/4/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

February 24, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10257383

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on February 11, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10257383

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10257383

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10257383001	**LAO-SS-1-020614**	Water	02/06/14 14:30	02/11/14 10:26
10257383002	**LAO-SS-1-021014**	Water	02/10/14 13:45	02/11/14 10:26
10257383003	**LAO-SS-2-021014**	Water	02/10/14 13:30	02/11/14 10:26

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10257383

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10257383001	**LAO-SS-1-020614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
10257383002	**LAO-SS-1-021014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
10257383003	**LAO-SS-2-021014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	AS2	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257383

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 24, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44451

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10257383001,10257629008

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1624594)
  - Calcium
  - Magnesium
  - Silver
- MS (Lab ID: 1624596)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1624595)
  - Calcium
  - Magnesium
  - Silver

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257383

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 24, 2014

Analyte Comments:

QC Batch: MPRP/44451

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1624594)
  - Calcium
- MSD (Lab ID: 1624595)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257383

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: February 24, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257383

Sample: LAO-SS-1-020614 **Lab ID: 10257383001** Collected: 02/06/14 14:30 Received: 02/11/14 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0037J**	mg/L	0.0040	0.0015	1	02/14/14 15:43	02/18/14 08:47	7429-90-5	
Arsenic	**0.0033**	mg/L	0.00050	0.000093	1	02/14/14 15:43	02/18/14 08:47	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000032	1	02/14/14 15:43	02/18/14 08:47	7440-43-9	
Calcium	**124**	mg/L	0.40	0.20	20	02/14/14 15:43	02/18/14 08:55	7440-70-2	M1
Copper	**0.0067**	mg/L	0.00050	0.00017	1	02/14/14 15:43	02/18/14 08:47	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0059	1	02/14/14 15:43	02/18/14 08:47	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	02/14/14 15:43	02/18/14 08:47	7439-92-1	
Magnesium	**35.8**	mg/L	0.10	0.048	20	02/14/14 15:43	02/18/14 08:55	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	02/14/14 15:43	02/18/14 08:47	7440-22-4	M1
Total Hardness by 2340B	**458**	mg/L	1.4	0.71	20	02/14/14 15:43	02/18/14 08:55		
Uranium-238	**0.0088**	mg/L	0.00050	0.00010	1	02/14/14 15:43	02/18/14 08:47	7440-61-1	
Zinc	**0.053**	mg/L	0.0050	0.00098	1	02/14/14 15:43	02/18/14 08:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 13:52	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257383

Sample: LAO-SS-1-021014 **Lab ID: 10257383002** Collected: 02/10/14 13:45 Received: 02/11/14 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0082**	mg/L	0.0040	0.0015	1	02/14/14 15:43	02/18/14 08:59	7429-90-5	
Arsenic	**0.0034**	mg/L	0.00050	0.000093	1	02/14/14 15:43	02/18/14 08:59	7440-38-2	
Cadmium	**0.00012**	mg/L	0.000080	0.000032	1	02/14/14 15:43	02/18/14 08:59	7440-43-9	
Calcium	**129**	mg/L	0.40	0.20	20	02/14/14 15:43	02/18/14 09:03	7440-70-2	
Copper	**0.0036**	mg/L	0.00050	0.00017	1	02/14/14 15:43	02/18/14 08:59	7440-50-8	
Iron	**0.0065J**	mg/L	0.050	0.0059	1	02/14/14 15:43	02/18/14 08:59	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	02/14/14 15:43	02/18/14 08:59	7439-92-1	
Magnesium	**37.1**	mg/L	0.10	0.048	20	02/14/14 15:43	02/18/14 09:03	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	02/14/14 15:43	02/18/14 08:59	7440-22-4	
Total Hardness by 2340B	**475**	mg/L	1.4	0.71	20	02/14/14 15:43	02/18/14 09:03		
Uranium-238	**0.0096**	mg/L	0.00050	0.00010	1	02/14/14 15:43	02/18/14 08:59	7440-61-1	
Zinc	**0.022**	mg/L	0.0050	0.00098	1	02/14/14 15:43	02/18/14 08:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 13:55	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257383

Sample: LAO-SS-2-021014 **Lab ID: 10257383003** Collected: 02/10/14 13:30 Received: 02/11/14 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**1.2**	mg/L	0.0040	0.0015	1	02/14/14 15:43	02/18/14 09:08	7429-90-5	
Arsenic	**0.14**	mg/L	0.00050	0.000093	1	02/14/14 15:43	02/18/14 09:08	7440-38-2	
Cadmium	**0.028**	mg/L	0.000080	0.000032	1	02/14/14 15:43	02/18/14 09:08	7440-43-9	
Calcium	**140**	mg/L	0.40	0.20	20	02/14/14 15:43	02/18/14 09:46	7440-70-2	
Copper	**3.2**	mg/L	0.010	0.0035	20	02/14/14 15:43	02/18/14 09:46	7440-50-8	
Iron	**23.7**	mg/L	1.0	0.12	20	02/14/14 15:43	02/18/14 09:46	7439-89-6	
Lead	**0.055**	mg/L	0.00010	0.000046	1	02/14/14 15:43	02/18/14 09:08	7439-92-1	
Magnesium	**36.8**	mg/L	0.10	0.048	20	02/14/14 15:43	02/18/14 09:46	7439-95-4	
Silver	**0.00032J**	mg/L	0.00050	0.000050	1	02/14/14 15:43	02/18/14 09:08	7440-22-4	
Total Hardness by 2340B	**501**	mg/L	1.4	0.71	20	02/14/14 15:43	02/18/14 09:46		
Uranium-238	**0.022**	mg/L	0.00050	0.00010	1	02/14/14 15:43	02/18/14 09:08	7440-61-1	
Zinc	**7.6**	mg/L	0.10	0.020	20	02/14/14 15:43	02/18/14 09:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00035**	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:02	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257383

QC Batch: MERP/10025 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10257383001, 10257383002, 10257383003

METHOD BLANK: 1626353 Matrix: Water
Associated Lab Samples: 10257383001, 10257383002, 10257383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	02/24/14 13:48	

LABORATORY CONTROL SAMPLE: 1626354

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1626355 1626356

Parameter	Units	10257383002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0052	101	104	85-115	3	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257383

QC Batch: MPRP/44451 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10257383001, 10257383002, 10257383003

METHOD BLANK: 1624592 Matrix: Water
Associated Lab Samples: 10257383001, 10257383002, 10257383003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	02/18/14 09:42	
Arsenic	mg/L	ND	0.00050	02/18/14 09:42	
Cadmium	mg/L	ND	0.000080	02/18/14 09:42	
Calcium	mg/L	ND	0.020	02/18/14 09:42	
Copper	mg/L	ND	0.00050	02/18/14 09:42	
Iron	mg/L	ND	0.050	02/18/14 09:42	
Lead	mg/L	ND	0.00010	02/18/14 09:42	
Magnesium	mg/L	ND	0.0050	02/18/14 09:42	
Silver	mg/L	ND	0.00050	02/18/14 09:42	
Uranium-238	mg/L	ND	0.00050	02/18/14 09:42	
Zinc	mg/L	ND	0.0050	02/18/14 09:42	

LABORATORY CONTROL SAMPLE: 1624593

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.089	111	85-115	
Arsenic	mg/L	.08	0.084	104	85-115	
Cadmium	mg/L	.08	0.084	105	85-115	
Calcium	mg/L	1	1.1	112	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.1	105	85-115	
Lead	mg/L	.08	0.087	108	85-115	
Magnesium	mg/L	1	1.1	110	85-115	
Silver	mg/L	.08	0.081	101	85-115	
Uranium-238	mg/L	.08	0.088	110	85-115	
Zinc	mg/L	.08	0.087	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1624594 1624595

Parameter	Units	10257383001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0037J	.08	.08	0.091	0.092	109	110	70-130	1	20	
Arsenic	mg/L	0.0033	.08	.08	0.085	0.087	102	104	70-130	2	20	
Cadmium	mg/L	0.00017	.08	.08	0.081	0.083	101	104	70-130	2	20	
Calcium	mg/L	124	1	1	123	120	-173	-418	70-130	2	20	E,M1
Copper	mg/L	0.0067	.08	.08	0.088	0.090	101	104	70-130	3	20	
Iron	mg/L	0.016J	1	1	1.0	1.0	100	103	70-130	2	20	
Lead	mg/L	0.00015	.08	.08	0.082	0.083	102	104	70-130	2	20	
Magnesium	mg/L	35.8	1	1	36.1	35.6	32	-19	70-130	1	20	M1
Silver	mg/L	ND	.08	.08	0.025	0.026	32	32	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257383

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1624594 1624595

Parameter	Units	10257383001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0088	.08	.08	0.091	0.093	103	106	70-130	2	20	
Zinc	mg/L	0.053	.08	.08	0.14	0.14	107	111	70-130	2	20	

MATRIX SPIKE SAMPLE: 1624596

Parameter	Units	10257629008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	ND	.08	0.090	109	70-130	
Arsenic	mg/L	0.50 ug/L	.08	0.084	104	70-130	
Cadmium	mg/L	ND	.08	0.081	102	70-130	
Calcium	mg/L	84800 ug/L	1	84.4	-30	70-130	M1
Copper	mg/L	18.3 ug/L	.08	0.11	109	70-130	
Iron	mg/L	ND	1	1.1	102	70-130	
Lead	mg/L	ND	.08	0.084	105	70-130	
Magnesium	mg/L	32200 ug/L	1	32.7	52	70-130	M1
Silver	mg/L	ND	.08	0.062	78	70-130	
Uranium-238	mg/L	1.9 ug/L	.08	0.086	105	70-130	
Zinc	mg/L	17.5 ug/L	.08	0.10	104	70-130	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10257383

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10257383

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10257383001	**LAO-SS-1-020614**	EPA 200.8	MPRP/44451	EPA 200.8	ICPM/19225
10257383002	**LAO-SS-1-021014**	EPA 200.8	MPRP/44451	EPA 200.8	ICPM/19225
10257383003	**LAO-SS-2-021014**	EPA 200.8	MPRP/44451	EPA 200.8	ICPM/19225
10257383001	**LAO-SS-1-020614**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257383002	**LAO-SS-1-021014**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257383003	**LAO-SS-2-021014**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10257383

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hanson

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 - 020614	2/6/14	1430		X						2				X			X							10257383001
	LAO-SS-1 - 021014	2/10/14	1345		X						2				X			X							002
	LAO-SS-2 - 021014	2/10/14	1330		X						1				X										003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ Rem						
Sampler's Company: Pioneer Technical Services	DJ Rem / PTS	2/10/14	1500	Chf Pace	2/11/14	10:20
Shipment Method: Fedex Ship Date: 2/10/14						
Shipment Tracking No: 8010 5778 6697						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: B.P. Pioneer Tech MT

Project #: WO# : 10257383

10257383

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 8005 7790 6697

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other: P.B **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.5 **Cooler Temp Corrected (°C):** 2.5 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** 2-11-14

Comments:

Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1-2/3, 3 X, 2-2/3
Per method, VOA pH is checked after analysis				Initial when completed: ____ Lot # of added preservative: ____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): ____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: ____ Date/Time: ____

Comments/Resolution:

Temp Log. Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 13:20	Temp: 2.5	Corrected Temp: 2.5
Time: 13:25	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: ____ **Date:** 2/11/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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February 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10257999

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on February 18, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10257999

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10257999

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10257999001	**LAO-SS-1-021314**	Water	02/13/14 12:50	02/18/14 09:35
10257999002	**LAO-SS-1-021714**	Water	02/17/14 15:10	02/18/14 09:35
10257999003	**LAO-SS-2-021714**	Water	02/17/14 14:35	02/18/14 09:35
10257999004	**LAO-SS-1T-021714**	Water	02/17/14 15:10	02/18/14 09:35
10257999005	**LAO-SS-3-021714**	Water	02/17/14 15:00	02/18/14 09:35
10257999006	**LAO-SS-4-021714**	Water	02/17/14 14:45	02/18/14 09:35
10257999007	**LAO-SS-A2-021714**	Water	02/17/14 13:30	02/18/14 09:35
10257999008	**LAO-SS-A3-021714**	Water	02/17/14 13:35	02/18/14 09:35
10257999009	**LAO-SS-SBC-01-021714**	Water	02/17/14 13:40	02/18/14 09:35
10257999010	**LAO-SS-06F-021714**	Water	02/17/14 13:43	02/18/14 09:35
10257999011	**LAO-SS-06G-021714**	Water	02/17/14 13:46	02/18/14 09:35

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10257999

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10257999001	**LAO-SS-1-021314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
10257999002	**LAO-SS-1-021714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10257999003	**LAO-SS-2-021714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10257999004	**LAO-SS-1T-021714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10257999005	**LAO-SS-3-021714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10257999006	**LAO-SS-4-021714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	AS2	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10257999007	**LAO-SS-A2-021714**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10257999008	**LAO-SS-A3-021714**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10257999

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540D	AAD	1	PASI-M
10257999009	**LAO-SS-SBC-01-021714**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10257999010	**LAO-SS-06F-021714**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10257999011	**LAO-SS-06G-021714**	SM 2320B	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 28, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44520

B: Analyte was detected in the associated method blank.

- BLANK for HBN 287190 [MPRP/445 (Lab ID: 1627701)
  - Silver
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44520

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10257999001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1627703)
  - Calcium
  - Silver
- MSD (Lab ID: 1627704)
  - Calcium
  - Magnesium
  - Silver

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 28, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/44520

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1627703)
  - Calcium
- MSD (Lab ID: 1627704)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: February 28, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: February 28, 2014

General Information:
10 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/34475

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10257999002,10258246002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1630189)
  - Alkalinity, Total as CaCO3
- MSD (Lab ID: 1630190)
  - Alkalinity, Total as CaCO3

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: February 28, 2014

General Information:
9 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: February 28, 2014

General Information:
9 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/34398

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1626767)
  - Total Suspended Solids

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1626767)
  - Total Suspended Solids

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10257999

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: February 28, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17382

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10257999002,10258509001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1629561)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1629562)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-1-021314 **Lab ID: 10257999001** Collected: 02/13/14 12:50 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.010**	mg/L	0.0040	0.0015	1	02/24/14 10:51	02/24/14 16:33	7429-90-5	
Arsenic	**0.0037**	mg/L	0.00050	0.000093	1	02/24/14 10:51	02/24/14 16:33	7440-38-2	
Cadmium	**0.00022**	mg/L	0.000080	0.000032	1	02/24/14 10:51	02/24/14 16:33	7440-43-9	
Calcium	**122**	mg/L	0.50	0.24	25	02/24/14 10:51	02/24/14 17:03	7440-70-2	M1
Copper	**0.0087**	mg/L	0.00050	0.00017	1	02/24/14 10:51	02/24/14 16:33	7440-50-8	
Iron	**0.030J**	mg/L	0.050	0.0059	1	02/24/14 10:51	02/24/14 16:33	7439-89-6	
Lead	**0.00047**	mg/L	0.00010	0.000046	1	02/24/14 10:51	02/24/14 16:33	7439-92-1	
Magnesium	**33.0**	mg/L	0.025	0.012	5	02/24/14 10:51	02/24/14 16:58	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	02/24/14 10:51	02/26/14 20:43	7440-22-4	M1
Total Hardness by 2340B	**441**	mg/L	1.8	0.89	25	02/24/14 10:51	02/24/14 17:03		
Uranium-238	**0.0092**	mg/L	0.00050	0.00010	1	02/24/14 10:51	02/24/14 16:33	7440-61-1	
Zinc	**0.070**	mg/L	0.0050	0.00098	1	02/24/14 10:51	02/24/14 16:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:10	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-1-021714 **Lab ID: 10257999002** Collected: 02/17/14 15:10 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0081**	mg/L	0.0040	0.0015	1	02/24/14 10:51	02/24/14 17:07	7429-90-5	
Arsenic	**0.0036**	mg/L	0.00050	0.000093	1	02/24/14 10:51	02/24/14 17:07	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000032	1	02/24/14 10:51	02/24/14 17:07	7440-43-9	
Calcium	**121**	mg/L	0.20	0.098	10	02/24/14 10:51	02/24/14 17:12	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	02/24/14 10:51	02/24/14 17:07	7440-50-8	
Iron	**0.027J**	mg/L	0.050	0.0059	1	02/24/14 10:51	02/24/14 17:07	7439-89-6	
Lead	**0.00038**	mg/L	0.00010	0.000046	1	02/24/14 10:51	02/24/14 17:07	7439-92-1	
Magnesium	**38.4**	mg/L	0.050	0.024	10	02/24/14 10:51	02/24/14 17:12	7439-95-4	
Silver	**0.000092J**	mg/L	0.00050	0.000050	1	02/24/14 10:51	02/26/14 20:25	7440-22-4	B
Total Hardness by 2340B	**459**	mg/L	0.71	0.36	10	02/24/14 10:51	02/24/14 17:12		
Uranium-238	**0.0091**	mg/L	0.00050	0.00010	1	02/24/14 10:51	02/24/14 17:07	7440-61-1	
Zinc	**0.057**	mg/L	0.0050	0.00098	1	02/24/14 10:51	02/24/14 17:07	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:12	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**58.0**	mg/L	5.0	2.5	1		02/27/14 11:09		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**803**	mg/L	10.0	5.0	1		02/20/14 10:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		02/19/14 12:55		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.20**	mg/L	0.10	0.050	1		02/25/14 14:20		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-2-021714 **Lab ID: 10257999003** Collected: 02/17/14 14:35 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.16**	mg/L	0.0040	0.0015	1	02/24/14 10:51	02/24/14 17:40	7429-90-5	
Arsenic	**0.026**	mg/L	0.00050	0.000093	1	02/24/14 10:51	02/24/14 17:40	7440-38-2	
Cadmium	**0.021**	mg/L	0.000080	0.000032	1	02/24/14 10:51	02/24/14 17:40	7440-43-9	
Calcium	**134**	mg/L	0.20	0.098	10	02/24/14 10:51	02/24/14 17:45	7440-70-2	
Copper	**0.65**	mg/L	0.0050	0.0017	10	02/24/14 10:51	02/24/14 17:45	7440-50-8	
Iron	**3.8**	mg/L	0.050	0.0059	1	02/24/14 10:51	02/24/14 17:40	7439-89-6	
Lead	**0.0067**	mg/L	0.00010	0.000046	1	02/24/14 10:51	02/24/14 17:40	7439-92-1	
Magnesium	**45.4**	mg/L	0.050	0.024	10	02/24/14 10:51	02/24/14 17:45	7439-95-4	
Silver	**0.000077J**	mg/L	0.00050	0.000050	1	02/24/14 10:51	02/26/14 20:30	7440-22-4	B
Total Hardness by 2340B	**522**	mg/L	0.71	0.36	10	02/24/14 10:51	02/24/14 17:45		
Uranium-238	**0.013**	mg/L	0.00050	0.00010	1	02/24/14 10:51	02/24/14 17:40	7440-61-1	
Zinc	**5.8**	mg/L	0.50	0.098	100	02/24/14 10:51	02/24/14 17:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:15	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**102**	mg/L	5.0	2.5	1		02/27/14 11:24		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**890**	mg/L	10.0	5.0	1		02/20/14 10:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11.0**	mg/L	10.0	5.0	1		02/19/14 12:55		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.58**	mg/L	0.10	0.050	1		02/25/14 14:21		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-1T-021714 **Lab ID: 10257999004** Collected: 02/17/14 15:10 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0095**	mg/L	0.0040	0.0015	1	02/24/14 10:51	02/24/14 17:53	7429-90-5	
Arsenic	**0.0037**	mg/L	0.00050	0.000093	1	02/24/14 10:51	02/24/14 17:53	7440-38-2	
Cadmium	**0.00022**	mg/L	0.000080	0.000032	1	02/24/14 10:51	02/24/14 17:53	7440-43-9	
Calcium	**121**	mg/L	0.20	0.098	10	02/24/14 10:51	02/24/14 17:58	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	02/24/14 10:51	02/24/14 17:53	7440-50-8	
Iron	**0.034J**	mg/L	0.050	0.0059	1	02/24/14 10:51	02/24/14 17:53	7439-89-6	
Lead	**0.00064**	mg/L	0.00010	0.000046	1	02/24/14 10:51	02/24/14 17:53	7439-92-1	
Magnesium	**38.6**	mg/L	0.050	0.024	10	02/24/14 10:51	02/24/14 17:58	7439-95-4	
Silver	**0.000060J**	mg/L	0.00050	0.000050	1	02/24/14 10:51	02/26/14 20:34	7440-22-4	B
Total Hardness by 2340B	**462**	mg/L	0.71	0.36	10	02/24/14 10:51	02/24/14 17:58		
Uranium-238	**0.0087**	mg/L	0.00050	0.00010	1	02/24/14 10:51	02/24/14 17:53	7440-61-1	
Zinc	**0.064**	mg/L	0.0050	0.00098	1	02/24/14 10:51	02/24/14 17:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:17	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**56.0**	mg/L	5.0	2.5	1		02/27/14 11:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**787**	mg/L	10.0	5.0	1		02/20/14 10:44		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		02/19/14 12:55		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.21**	mg/L	0.10	0.050	1		02/25/14 14:24		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-3-021714 **Lab ID: 10257999005** Collected: 02/17/14 15:00 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.43**	mg/L	0.0040	0.0015	1	02/24/14 10:51	02/24/14 18:22	7429-90-5	
Arsenic	**0.0047**	mg/L	0.00050	0.000093	1	02/24/14 10:51	02/24/14 18:22	7440-38-2	
Cadmium	**0.032**	mg/L	0.000080	0.000032	1	02/24/14 10:51	02/24/14 18:22	7440-43-9	
Calcium	**137**	mg/L	0.20	0.098	10	02/24/14 10:51	02/24/14 18:27	7440-70-2	
Copper	**1.8**	mg/L	0.0050	0.0017	10	02/24/14 10:51	02/24/14 18:27	7440-50-8	
Iron	**11.4**	mg/L	0.050	0.0059	1	02/24/14 10:51	02/24/14 18:22	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	02/24/14 10:51	02/24/14 18:22	7439-92-1	
Magnesium	**41.1**	mg/L	0.050	0.024	10	02/24/14 10:51	02/24/14 18:27	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	02/24/14 10:51	02/26/14 20:39	7440-22-4	
Total Hardness by 2340B	**511**	mg/L	0.71	0.36	10	02/24/14 10:51	02/24/14 18:27		
Uranium-238	**0.014**	mg/L	0.00050	0.00010	1	02/24/14 10:51	02/24/14 18:22	7440-61-1	
Zinc	**7.0**	mg/L	0.50	0.098	100	02/24/14 10:51	02/24/14 18:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:20	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**65.0**	mg/L	5.0	2.5	1		02/27/14 11:33		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**899**	mg/L	10.0	5.0	1		02/20/14 10:44		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**30.0**	mg/L	10.0	5.0	1		02/19/14 12:55		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		02/25/14 14:25		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-4-021714 **Lab ID: 10257999006** Collected: 02/17/14 14:45 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0038J**	mg/L	0.0040	0.0015	1	02/24/14 10:51	02/24/14 17:31	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.000093	1	02/24/14 10:51	02/24/14 17:31	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	02/24/14 10:51	02/24/14 17:31	7440-43-9	
Calcium	**0.012J**	mg/L	0.020	0.0098	1	02/24/14 10:51	02/26/14 20:21	7440-70-2	
Copper	**0.0018**	mg/L	0.00050	0.00017	1	02/24/14 10:51	02/24/14 17:31	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	02/24/14 10:51	02/24/14 17:31	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	02/24/14 10:51	02/24/14 17:31	7439-92-1	
Magnesium	**0.0064**	mg/L	0.0050	0.0024	1	02/24/14 10:51	02/24/14 17:31	7439-95-4	
Silver	**0.000073J**	mg/L	0.00050	0.000050	1	02/24/14 10:51	02/26/14 20:21	7440-22-4	B
Total Hardness by 2340B	**0.057J**	mg/L	0.071	0.036	1	02/24/14 10:51	02/24/14 17:31		
Uranium-238	ND	mg/L	0.00050	0.00010	1	02/24/14 10:51	02/24/14 17:31	7440-61-1	
Zinc	**0.0017J**	mg/L	0.0050	0.00098	1	02/24/14 10:51	02/24/14 17:31	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	02/20/14 08:51	02/24/14 14:22	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		02/27/14 11:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		02/20/14 10:45		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		02/19/14 12:55		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		02/25/14 14:26		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-A2-021714 **Lab ID: 10257999007** Collected: 02/17/14 13:30 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**53.0**	mg/L	5.0	2.5	1		02/27/14 11:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**816**	mg/L	10.0	5.0	1		02/20/14 10:38		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		02/19/14 12:55		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-A3-021714 **Lab ID: 10257999008** Collected: 02/17/14 13:35 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**56.6**	mg/L	5.0	2.5	1		02/27/14 11:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**789**	mg/L	10.0	5.0	1		02/22/14 12:51		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**5.0J**	mg/L	10.0	5.0	1		02/19/14 12:55		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-SBC-01-021714 **Lab ID: 10257999009** Collected: 02/17/14 13:40 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**105**	mg/L	5.0	2.5	1		02/27/14 12:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**262**	mg/L	10.0	5.0	1		02/22/14 12:52		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**13.0**	mg/L	10.0	5.0	1		02/19/14 12:55		D6,D8

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-06F-021714 **Lab ID: 10257999010** Collected: 02/17/14 13:43 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**96.4**	mg/L	5.0	2.5	1		02/27/14 12:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**364**	mg/L	10.0	5.0	1		02/22/14 12:52		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**12.0**	mg/L	10.0	5.0	1		02/20/14 15:49		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10257999

Sample: LAO-SS-06G-021714 **Lab ID: 10257999011** Collected: 02/17/14 13:46 Received: 02/18/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**101**	mg/L	5.0	2.5	1		02/27/14 12:10		

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: MERP/10025 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10257999001, 10257999002, 10257999003, 10257999004, 10257999005, 10257999006

METHOD BLANK: 1626353 Matrix: Water
Associated Lab Samples: 10257999001, 10257999002, 10257999003, 10257999004, 10257999005, 10257999006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	02/24/14 13:48	

LABORATORY CONTROL SAMPLE: 1626354

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1626355 1626356

Parameter	Units	10257383002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0052	101	104	85-115	3	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: MPRP/44520 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10257999001, 10257999002, 10257999003, 10257999004, 10257999005, 10257999006

METHOD BLANK: 1627701 | Matrix: Water
Associated Lab Samples: 10257999001, 10257999002, 10257999003, 10257999004, 10257999005, 10257999006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	02/24/14 16:29	
Arsenic	mg/L	ND	0.00050	02/24/14 16:29	
Cadmium	mg/L	ND	0.000080	02/24/14 16:29	
Calcium	mg/L	ND	0.020	02/24/14 16:29	
Copper	mg/L	ND	0.00050	02/24/14 16:29	
Iron	mg/L	ND	0.050	02/24/14 16:29	
Lead	mg/L	ND	0.00010	02/24/14 16:29	
Magnesium	mg/L	ND	0.0050	02/24/14 16:29	
Silver	mg/L	0.00013J	0.00050	02/26/14 20:16	
Uranium-238	mg/L	ND	0.00050	02/24/14 16:29	
Zinc	mg/L	0.0011J	0.0050	02/24/14 16:29	

LABORATORY CONTROL SAMPLE: 1627702

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.081	102	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	1.1	107	85-115	
Copper	mg/L	.08	0.082	102	85-115	
Iron	mg/L	1	1.0	101	85-115	
Lead	mg/L	.08	0.082	102	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.080	101	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.083	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1627703 1627704

Parameter	Units	10257999001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.010	.08	.08	0.097	0.10	109	115	70-130	5	20	
Arsenic	mg/L	0.0037	.08	.08	0.084	0.085	101	102	70-130	.8	20	
Cadmium	mg/L	0.00022	.08	.08	0.078	0.078	97	97	70-130	.6	20	
Calcium	mg/L	122	1	1	120	123	-256	40	70-130	2	20	E,M1
Copper	mg/L	0.0087	.08	.08	0.085	0.086	96	96	70-130	.7	20	
Iron	mg/L	0.030J	1	1	1.0	1.0	97	98	70-130	1	20	
Lead	mg/L	0.00047	.08	.08	0.078	0.078	97	98	70-130	.4	20	
Magnesium	mg/L	33.0	1	1	33.7	34.4	70	134	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.031	0.031	38	39	70-130	2	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1627703 1627704

Parameter	Units	10257999001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0092	.08	.08	0.089	0.090	99	101	70-130	1	20	
Zinc	mg/L	0.070	.08	.08	0.15	0.15	100	102	70-130	1	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: WET/34475 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006, 10257999007, 10257999008, 10257999009, 10257999010, 10257999011

METHOD BLANK: 1630184 | Matrix: Water
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006, 10257999007, 10257999008, 10257999009, 10257999010, 10257999011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	02/27/14 10:55	

LABORATORY CONTROL SAMPLE & LCSD: 1630185 1630186

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.4	41.4	103	104	90-110	.1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1630187 1630188

Parameter	Units	10257999002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	58.0	40	40	97.2	92.7	98	87	80-120	5	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1630189 1630190

Parameter	Units	10258246002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	460000 ug/L	40	40	512	515	130	138	80-120	.6	30	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: WET/34393 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006, 10257999007

METHOD BLANK: 1626665 | Matrix: Water
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006, 10257999007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	5.0J	10.0	02/20/14 10:34	

LABORATORY CONTROL SAMPLE: 1626666

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	884	88	80-120	

SAMPLE DUPLICATE: 1626667

Parameter	Units	10257999007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	816	828	1	10	

SAMPLE DUPLICATE: 1626668

Parameter	Units	10257999006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: WET/34449 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10257999008, 10257999009, 10257999010

METHOD BLANK: 1628601 | Matrix: Water
Associated Lab Samples: 10257999008, 10257999009, 10257999010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	02/22/14 12:48	

LABORATORY CONTROL SAMPLE: 1628602

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	950	95	80-120	

SAMPLE DUPLICATE: 1628603

Parameter	Units	10258384001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	257	259	.8	10	

SAMPLE DUPLICATE: 1628604

Parameter	Units	10258488006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	222	227	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: WET/34398 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006, 10257999007, 10257999008, 10257999009

METHOD BLANK: 1626764 | Matrix: Water
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006, 10257999007, 10257999008, 10257999009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	02/19/14 12:56	

LABORATORY CONTROL SAMPLE: 1626765

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	92.0	92	80-120	

SAMPLE DUPLICATE: 1626766

Parameter	Units	10258038001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	36.0	36.0	0	10	H1

SAMPLE DUPLICATE: 1626767

Parameter	Units	10257999009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	13.0	17.0	27	10	D6,D8

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: WET/34419 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10257999010

METHOD BLANK: 1627537 | Matrix: Water
Associated Lab Samples: 10257999010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	02/20/14 15:49	

LABORATORY CONTROL SAMPLE: 1627538

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94.0	94	80-120	

SAMPLE DUPLICATE: 1627539

Parameter	Units	10257999010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	12.0	13.0	8	10	

SAMPLE DUPLICATE: 1627540

Parameter	Units	10258224001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	559	559	0	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10257999

QC Batch: WETA/17382 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006

METHOD BLANK: 1629559 | Matrix: Water
Associated Lab Samples: 10257999002, 10257999003, 10257999004, 10257999005, 10257999006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	02/25/14 14:02	

LABORATORY CONTROL SAMPLE: 1629560

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1629561 1629562

Parameter	Units	10257999002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.20	2.5	2.5	0.55	0.54	14	13	80-120	3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1629563 1629564

Parameter	Units	10258509001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	2.3	2.4	89	94	80-120	6	30	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10257999

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10257999

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10257999001	**LAO-SS-1-021314**	EPA 200.8	MPRP/44520	EPA 200.8	ICPM/19270
10257999002	**LAO-SS-1-021714**	EPA 200.8	MPRP/44520	EPA 200.8	ICPM/19270
10257999003	**LAO-SS-2-021714**	EPA 200.8	MPRP/44520	EPA 200.8	ICPM/19270
10257999004	**LAO-SS-1T-021714**	EPA 200.8	MPRP/44520	EPA 200.8	ICPM/19270
10257999005	**LAO-SS-3-021714**	EPA 200.8	MPRP/44520	EPA 200.8	ICPM/19270
10257999006	**LAO-SS-4-021714**	EPA 200.8	MPRP/44520	EPA 200.8	ICPM/19270
10257999001	**LAO-SS-1-021314**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257999002	**LAO-SS-1-021714**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257999003	**LAO-SS-2-021714**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257999004	**LAO-SS-1T-021714**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257999005	**LAO-SS-3-021714**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257999006	**LAO-SS-4-021714**	EPA 245.1	MERP/10025	EPA 245.1	MERC/11547
10257999002	**LAO-SS-1-021714**	SM 2320B	WET/34475		
10257999003	**LAO-SS-2-021714**	SM 2320B	WET/34475		
10257999004	**LAO-SS-1T-021714**	SM 2320B	WET/34475		
10257999005	**LAO-SS-3-021714**	SM 2320B	WET/34475		
10257999006	**LAO-SS-4-021714**	SM 2320B	WET/34475		
10257999007	**LAO-SS-A2-021714**	SM 2320B	WET/34475		
10257999008	**LAO-SS-A3-021714**	SM 2320B	WET/34475		
10257999009	**LAO-SS-SBC-01-021714**	SM 2320B	WET/34475		
10257999010	**LAO-SS-06F-021714**	SM 2320B	WET/34475		
10257999011	**LAO-SS-06G-021714**	SM 2320B	WET/34475		
10257999002	**LAO-SS-1-021714**	SM 2540C	WET/34393		
10257999003	**LAO-SS-2-021714**	SM 2540C	WET/34393		
10257999004	**LAO-SS-1T-021714**	SM 2540C	WET/34393		
10257999005	**LAO-SS-3-021714**	SM 2540C	WET/34393		
10257999006	**LAO-SS-4-021714**	SM 2540C	WET/34393		
10257999007	**LAO-SS-A2-021714**	SM 2540C	WET/34393		
10257999008	**LAO-SS-A3-021714**	SM 2540C	WET/34449		
10257999009	**LAO-SS-SBC-01-021714**	SM 2540C	WET/34449		
10257999010	**LAO-SS-06F-021714**	SM 2540C	WET/34449		
10257999002	**LAO-SS-1-021714**	SM 2540D	WET/34398		
10257999003	**LAO-SS-2-021714**	SM 2540D	WET/34398		
10257999004	**LAO-SS-1T-021714**	SM 2540D	WET/34398		
10257999005	**LAO-SS-3-021714**	SM 2540D	WET/34398		
10257999006	**LAO-SS-4-021714**	SM 2540D	WET/34398		
10257999007	**LAO-SS-A2-021714**	SM 2540D	WET/34398		
10257999008	**LAO-SS-A3-021714**	SM 2540D	WET/34398		
10257999009	**LAO-SS-SBC-01-021714**	SM 2540D	WET/34398		
10257999010	**LAO-SS-06F-021714**	SM 2540D	WET/34419		
10257999002	**LAO-SS-1-021714**	SM 4500-NO3 H	WETA/17382		
10257999003	**LAO-SS-2-021714**	SM 4500-NO3 H	WETA/17382		
10257999004	**LAO-SS-1T-021714**	SM 4500-NO3 H	WETA/17382		
10257999005	**LAO-SS-3-021714**	SM 4500-NO3 H	WETA/17382		
10257999006	**LAO-SS-4-021714**	SM 4500-NO3 H	WETA/17382		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
Req Due Date (mm/dd/yy):
Rush TAT: Yes ____ No x
BP Facility No: LAO Wetlands (Weekly)
Lab Work Order Number: 10257999

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hanson
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	TDS/TSS/Alkalinity	Nitrate Nitrite					Comments
	LAO-SS-1 - 021314	2/13/14	1250.		X			2			2				X			X							10257999001
	LAO-SS-1 - 021714	2/17/14	1510.		X			4	X	1	2				X			X	X	X					002
	LAO-SS-2 - 021714		1435		X			3	1	1	1				X				X	X					003
	LAO-SS-1T-021714		1510		X			3	1	1	1				X				X	X					004
	LAO-SS-3-021714		1500		X			3	1	1	1				X				X	X					005
	LAO-SS-4 - 021714		1445		X			3	1	1	1				X				X	X					006
	LAO-SS-A2-021714		1330		X			1	1										X						007
	LAO-SS-A3-021714		1335		X			1	1										X						008
	LAO-SS-SBC-01-021714		1340		X			1	1										X						009
	LAO-SS-06F-021714		1343		X			1	1										X						010

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell						
Sampler's Company: Pioneer Technical Services	CJ Kissell / PTS	2/17/14	1530	[illegible] PACE	2/18/14	935
Shipment Method: Fed Ex Ship Date: 2/17/14						
Shipment Tracking No: 8010 5778 6653						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (No circled) | Temp Blank: Yes / No (No circled) | Cooler Temp on Receipt: 3.0 °F/C | Trip Blank: Yes / No (No circled) | MS/MSD Sample Submitted: Yes / No (No circled)

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10257999

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hansen

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Alkalinity							Comments
	~~LAO-SS-1~~				X						2				X			X								
	~~LAO-SS-1~~				X						2				X			X								
	~~LAO-SS-2~~				X						1				X											
	LAO-SS-06G-021714	2/17/14	1346		X			1	1										X							10257999 011

Sampler's Name:	CJ Kissell	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company:	Pioneer Technical Services	CJ Kissell / PTS	2/17	1530	[illegible] Pace	2/18/14	935
Shipment Method:	FedEx Ship Date: 2/17/14						
Shipment Tracking No:	~~810~~ 8010 5778 6653						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 30 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10257999

10257999

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 8010 8779 8653

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.0 **Cooler Temp Corrected (°C):** 3.0 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** TNC **Date and Initials of Person Examining Contents:** BD 2/14/14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? JT 2/18/14	☐ Yes	☑ No	☐ N/A	11.
Sample Labels Match COC?	☐ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ½ ☑ HNO_3 ½ ☑ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☐ Yes	☐ No	☑ N/A	Sample # 01-06
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1150	Temp: 3.0	Corrected Temp:
Time: 1207	put in cooler	
Time: 1207	Temp: ~~2.8~~	Corrected Temp: ~~2.8~~

JT 2/18/14

Project Manager Review: **Date:** 2/18/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

March 06, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10258670

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on February 25, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10258670

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10258670

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10258670001	**LAO-SS-1-022014**	Water	02/20/14 14:20	02/25/14 09:55
10258670002	**LAO-SS-1-022414**	Water	02/24/14 14:15	02/25/14 09:55
10258670003	**LAO-SS-2-022414**	Water	02/24/14 14:30	02/25/14 09:55

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10258670

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10258670001	**LAO-SS-1-022014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10258670002	**LAO-SS-1-022414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10258670003	**LAO-SS-2-022414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10258670

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 06, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44585

B: Analyte was detected in the associated method blank.

- BLANK for HBN 287919 [MPRP/445 (Lab ID: 1631431)
  - Silver

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44585

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10258670001,10258789004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1631461)
  - Calcium
  - Magnesium
  - Silver
- MSD (Lab ID: 1631462)
  - Calcium
  - Magnesium
  - Silver

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10258670

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 06, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/44585

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1631461)
  - Calcium
- MSD (Lab ID: 1631462)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10258670

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: March 06, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/10048

B: Analyte was detected in the associated method blank.

- BLANK for HBN 287821 [MERP/100 (Lab ID: 1630945)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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(612)607-1700

ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10258670

Sample: LAO-SS-1-022014 **Lab ID: 10258670001** Collected: 02/20/14 14:20 Received: 02/25/14 09:55 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0035J**	mg/L	0.0040	0.0015	1	02/28/14 11:57	03/04/14 18:23	7429-90-5	
Arsenic	**0.0036**	mg/L	0.00050	0.000093	1	02/28/14 11:57	03/04/14 18:23	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000032	1	02/28/14 11:57	03/04/14 18:23	7440-43-9	
Calcium	**123**	mg/L	0.50	0.24	25	02/28/14 11:57	03/04/14 18:52	7440-70-2	M1
Copper	**0.0099**	mg/L	0.00050	0.00017	1	02/28/14 11:57	03/04/14 18:23	7440-50-8	
Iron	**0.018J**	mg/L	0.050	0.0059	1	02/28/14 11:57	03/04/14 18:23	7439-89-6	
Lead	**0.00019**	mg/L	0.00010	0.000046	1	02/28/14 11:57	03/04/14 18:23	7439-92-1	
Magnesium	**44.8**	mg/L	0.025	0.012	5	02/28/14 11:57	03/04/14 18:48	7439-95-4	M1
Silver	**0.00016J**	mg/L	0.00050	0.000050	1	02/28/14 11:57	03/04/14 18:23	7440-22-4	B,M1
Total Hardness by 2340B	**492**	mg/L	1.8	0.89	25	02/28/14 11:57	03/04/14 18:52		
Uranium-238	**0.0083**	mg/L	0.00050	0.00010	1	02/28/14 11:57	03/04/14 18:23	7440-61-1	
Zinc	**0.053**	mg/L	0.0050	0.00098	1	02/28/14 11:57	03/04/14 18:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000030J**	mg/L	0.00020	0.000030	1	02/28/14 11:23	03/04/14 17:18	7439-97-6	B

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10258670

Sample: LAO-SS-1-022414 **Lab ID: 10258670002** Collected: 02/24/14 14:15 Received: 02/25/14 09:55 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0094**	mg/L	0.0040	0.0015	1	02/28/14 11:57	03/04/14 19:02	7429-90-5	
Arsenic	**0.0034**	mg/L	0.00050	0.000093	1	02/28/14 11:57	03/04/14 19:02	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000032	1	02/28/14 11:57	03/04/14 19:02	7440-43-9	
Calcium	**122**	mg/L	0.20	0.098	10	02/28/14 11:57	03/04/14 19:06	7440-70-2	
Copper	**0.0091**	mg/L	0.00050	0.00017	1	02/28/14 11:57	03/04/14 19:02	7440-50-8	
Iron	**0.028J**	mg/L	0.050	0.0059	1	02/28/14 11:57	03/04/14 19:02	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	02/28/14 11:57	03/04/14 19:02	7439-92-1	
Magnesium	**42.8**	mg/L	0.050	0.024	10	02/28/14 11:57	03/04/14 19:06	7439-95-4	
Silver	**0.000074J**	mg/L	0.00050	0.000050	1	02/28/14 11:57	03/04/14 19:02	7440-22-4	B
Total Hardness by 2340B	**481**	mg/L	0.71	0.36	10	02/28/14 11:57	03/04/14 19:06		
Uranium-238	**0.0078**	mg/L	0.00050	0.00010	1	02/28/14 11:57	03/04/14 19:02	7440-61-1	
Zinc	**0.049**	mg/L	0.0050	0.00098	1	02/28/14 11:57	03/04/14 19:02	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000030J**	mg/L	0.00020	0.000030	1	02/28/14 11:23	03/04/14 17:20	7439-97-6	B

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10258670

Sample: LAO-SS-2-022414 **Lab ID: 10258670003** Collected: 02/24/14 14:30 Received: 02/25/14 09:55 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.10**	mg/L	0.0040	0.0015	1	02/28/14 11:57	03/04/14 19:26	7429-90-5	
Arsenic	**0.022**	mg/L	0.00050	0.000093	1	02/28/14 11:57	03/04/14 19:26	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000032	1	02/28/14 11:57	03/04/14 19:26	7440-43-9	
Calcium	**138**	mg/L	0.20	0.098	10	02/28/14 11:57	03/04/14 19:30	7440-70-2	
Copper	**0.50**	mg/L	0.0050	0.0017	10	02/28/14 11:57	03/04/14 19:30	7440-50-8	
Iron	**3.0**	mg/L	0.050	0.0059	1	02/28/14 11:57	03/04/14 19:26	7439-89-6	
Lead	**0.0056**	mg/L	0.00010	0.000046	1	02/28/14 11:57	03/04/14 19:26	7439-92-1	
Magnesium	**44.3**	mg/L	0.050	0.024	10	02/28/14 11:57	03/04/14 19:30	7439-95-4	
Silver	**0.00014J**	mg/L	0.00050	0.000050	1	02/28/14 11:57	03/04/14 19:26	7440-22-4	B
Total Hardness by 2340B	**528**	mg/L	0.71	0.36	10	02/28/14 11:57	03/04/14 19:30		
Uranium-238	**0.013**	mg/L	0.00050	0.00010	1	02/28/14 11:57	03/04/14 19:26	7440-61-1	
Zinc	**5.3**	mg/L	0.50	0.098	100	02/28/14 11:57	03/04/14 19:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000060J**	mg/L	0.00020	0.000030	1	02/28/14 11:23	03/04/14 17:22	7439-97-6	B

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10258670

QC Batch: MERP/10048 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10258670001, 10258670002, 10258670003

METHOD BLANK: 1630945 | Matrix: Water
Associated Lab Samples: 10258670001, 10258670002, 10258670003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000030J	0.00020	03/04/14 16:34	

LABORATORY CONTROL SAMPLE: 1630946

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1630947 1630948

Parameter	Units	10258488002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000030J	.005	.005	0.0049	0.0052	97	103	85-115	6	20	

MATRIX SPIKE SAMPLE: 1630949

Parameter	Units	10258670003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000060J	.005	0.0049	97	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10258670

QC Batch: MPRP/44585 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10258670001, 10258670002, 10258670003

METHOD BLANK: 1631431 | Matrix: Water
Associated Lab Samples: 10258670001, 10258670002, 10258670003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	03/04/14 17:22	
Arsenic	mg/L	ND	0.00050	03/04/14 17:22	
Cadmium	mg/L	ND	0.000080	03/04/14 17:22	
Calcium	mg/L	ND	0.020	03/04/14 17:22	
Copper	mg/L	ND	0.00050	03/04/14 17:22	
Iron	mg/L	ND	0.050	03/04/14 17:22	
Lead	mg/L	ND	0.00010	03/04/14 17:22	
Magnesium	mg/L	ND	0.0050	03/04/14 17:22	
Silver	mg/L	0.000095J	0.00050	03/04/14 17:22	
Uranium-238	mg/L	ND	0.00050	03/04/14 17:22	
Zinc	mg/L	0.0016J	0.0050	03/04/14 17:22	

LABORATORY CONTROL SAMPLE: 1631432

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.089	112	85-115	
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.083	104	85-115	
Calcium	mg/L	1	1.1	108	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.084	105	85-115	
Magnesium	mg/L	1	1.1	108	85-115	
Silver	mg/L	.08	0.084	105	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.084	106	85-115	

MATRIX SPIKE SAMPLE: 1631435

Parameter	Units	10258789004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	1.9J ug/L	.08	0.095	116	70-130	
Arsenic	mg/L	ND	.08	0.084	105	70-130	
Cadmium	mg/L	ND	.08	0.085	107	70-130	
Calcium	mg/L	138 ug/L	1	1.2	109	70-130	
Copper	mg/L	0.45J ug/L	.08	0.086	107	70-130	
Iron	mg/L	ND	1	1.1	112	70-130	
Lead	mg/L	ND	.08	0.088	110	70-130	
Magnesium	mg/L	47.8 ug/L	1	1.2	113	70-130	
Silver	mg/L	ND	.08	0.085	106	70-130	
Uranium-238	mg/L	ND	.08	0.082	102	70-130	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10258670

MATRIX SPIKE SAMPLE: 1631435

Parameter	Units	10258789004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Zinc	mg/L	1.9J ug/L	.08	0.088	107	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1631461 1631462

Parameter	Units	10258670001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0035J	.08	.08	0.092	0.092	111	110	70-130	.3	20	
Arsenic	mg/L	0.0036	.08	.08	0.089	0.088	107	106	70-130	.8	20	
Cadmium	mg/L	0.00017	.08	.08	0.083	0.085	104	106	70-130	2	20	
Calcium	mg/L	123	1	1	121	123	-174	40	70-130	2	20	E,M1
Copper	mg/L	0.0099	.08	.08	0.092	0.093	103	104	70-130	1	20	
Iron	mg/L	0.018J	1	1	1.1	1.1	108	113	70-130	4	20	
Lead	mg/L	0.00019	.08	.08	0.084	0.085	105	106	70-130	1	20	
Magnesium	mg/L	44.8	1	1	43.8	44.2	-99	-63	70-130	.8	20	M1
Silver	mg/L	0.00016 J	.08	.08	0.028	0.028	35	34	70-130	2	20	M1
Uranium-238	mg/L	0.0083	.08	.08	0.088	0.090	100	102	70-130	1	20	
Zinc	mg/L	0.053	.08	.08	0.14	0.14	104	105	70-130	.5	20	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10258670

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10258670

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10258670001	**LAO-SS-1-022014**	EPA 200.8	MPRP/44585	EPA 200.8	ICPM/19310
10258670002	**LAO-SS-1-022414**	EPA 200.8	MPRP/44585	EPA 200.8	ICPM/19310
10258670003	**LAO-SS-2-022414**	EPA 200.8	MPRP/44585	EPA 200.8	ICPM/19310
10258670001	**LAO-SS-1-022014**	EPA 245.1	MERP/10048	EPA 245.1	MERC/11586
10258670002	**LAO-SS-1-022414**	EPA 245.1	MERP/10048	EPA 245.1	MERC/11586
10258670003	**LAO-SS-2-022414**	EPA 245.1	MERP/10048	EPA 245.1	MERC/11586

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Laboratory Management Program LaMP Chain of Custody Record

1123

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10258670

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hanford

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-022014	2/20/14	1420		X						2				X	X	10258670 001
	LAO-SS-1-022414	2/24/14	1415		X						2				X	X	002
	LAO-SS-2-022414	2/24/14	1430		X						1				X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell						
Sampler's Company: Pioneer Technical Services	CJ Kissell / PTS	2/24/14	1440	[illegible] / PACE	2/25/14	955
Shipment Method: Fed Ex Ship Date: 2/24/14						
Shipment Tracking No: 8010 5778 4686						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (No) | Temp Blank: Yes / No (Yes) | Cooler Temp on Receipt: 1.3 °F/C | Trip Blank: Yes / No (No) | MS/MSD Sample Submitted: Yes / No (No)

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP/Pioneer

Project #: WO# : 10258670

10258670

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: 8010 5778 6686

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other:_____ **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80S12447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.4 **Cooler Temp Corrected (°C):** 1.3 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.9 **Date and Initials of Person Examining Contents:** 2-25-14/AT

Comments:

Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 3 1/1
Per method, VOA pH is checked after analysis				Initial when completed:_____ Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1200	Temp:	Corrected Temp: 1.3
Time: 1210	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 2/25/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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March 20, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on March 04, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This report was revised on 3/20/14. The results for 003 was not matching historicals. Upon inspection of the bottle, it looked like it may not have been prepped. All samples were re-prepped and re-ran in case there was a mix-up. Results have been updated.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10259276001	**LAO-SS-1-022714**	Water	02/27/14 15:45	03/04/14 10:00
10259276002	**LAO-SS-1-030314**	Water	03/03/14 13:50	03/04/14 10:00
10259276003	**LAO-SS-2-030314**	Water	03/03/14 14:00	03/04/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10259276001	**LAO-SS-1-022714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10259276002	**LAO-SS-1-030314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10259276003	**LAO-SS-2-030314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 20, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44751

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10259276003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1638873)
  - Calcium
  - Magnesium
  - Silver
  - Zinc
- MSD (Lab ID: 1638874)
  - Calcium
  - Magnesium
  - Silver
  - Zinc

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 20, 2014

Analyte Comments:

QC Batch: MPRP/44751

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1638873)
  - Calcium
  - Zinc
- MSD (Lab ID: 1638874)
  - Calcium
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: March 20, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/10064

B: Analyte was detected in the associated method blank.

- BLANK for HBN 288307 [MERP/100 (Lab ID: 1633471)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Sample: LAO-SS-1-022714 **Lab ID: 10259276001** Collected: 02/27/14 15:45 Received: 03/04/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0039J**	mg/L	0.0040	0.0015	1	03/14/14 12:00	03/17/14 15:01	7429-90-5	
Arsenic	**0.0032**	mg/L	0.00050	0.000093	1	03/14/14 12:00	03/17/14 15:01	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000032	1	03/14/14 12:00	03/17/14 15:01	7440-43-9	
Calcium	**105**	mg/L	0.20	0.098	10	03/14/14 12:00	03/18/14 10:41	7440-70-2	
Copper	**0.0077**	mg/L	0.00050	0.00017	1	03/14/14 12:00	03/17/14 15:01	7440-50-8	
Iron	**0.015J**	mg/L	0.050	0.0059	1	03/14/14 12:00	03/17/14 15:01	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	03/14/14 12:00	03/17/14 15:01	7439-92-1	
Magnesium	**37.9**	mg/L	0.050	0.024	10	03/14/14 12:00	03/18/14 10:41	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/14/14 12:00	03/17/14 15:01	7440-22-4	
Total Hardness by 2340B	**418**	mg/L	0.71	0.36	10	03/14/14 12:00	03/18/14 10:41		
Uranium-238	**0.0080**	mg/L	0.00050	0.00010	1	03/14/14 12:00	03/17/14 15:01	7440-61-1	
Zinc	**0.048**	mg/L	0.0050	0.00098	1	03/14/14 12:00	03/17/14 15:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000031J**	mg/L	0.00020	0.000030	1	03/07/14 09:35	03/10/14 15:48	7439-97-6	B

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Sample: LAO-SS-1-030314 **Lab ID: 10259276002** Collected: 03/03/14 13:50 Received: 03/04/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0078**	mg/L	0.0040	0.0015	1	03/14/14 12:00	03/17/14 15:10	7429-90-5	
Arsenic	**0.0033**	mg/L	0.00050	0.000093	1	03/14/14 12:00	03/17/14 15:10	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000032	1	03/14/14 12:00	03/17/14 15:10	7440-43-9	
Calcium	**104**	mg/L	0.20	0.098	10	03/14/14 12:00	03/18/14 10:46	7440-70-2	
Copper	**0.0078**	mg/L	0.00050	0.00017	1	03/14/14 12:00	03/17/14 15:10	7440-50-8	
Iron	**0.023J**	mg/L	0.050	0.0059	1	03/14/14 12:00	03/17/14 15:10	7439-89-6	
Lead	**0.00021**	mg/L	0.00010	0.000046	1	03/14/14 12:00	03/17/14 15:10	7439-92-1	
Magnesium	**37.3**	mg/L	0.050	0.024	10	03/14/14 12:00	03/18/14 10:46	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/14/14 12:00	03/17/14 15:10	7440-22-4	
Total Hardness by 2340B	**413**	mg/L	0.71	0.36	10	03/14/14 12:00	03/18/14 10:46		
Uranium-238	**0.0082**	mg/L	0.00050	0.00010	1	03/14/14 12:00	03/17/14 15:10	7440-61-1	
Zinc	**0.053**	mg/L	0.0050	0.00098	1	03/14/14 12:00	03/17/14 15:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000031J**	mg/L	0.00020	0.000030	1	03/07/14 09:35	03/10/14 15:59	7439-97-6	B

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Sample: LAO-SS-2-030314 **Lab ID: 10259276003** Collected: 03/03/14 14:00 Received: 03/04/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.097**	mg/L	0.0040	0.0015	1	03/14/14 12:00	03/17/14 15:42	7429-90-5	
Arsenic	**0.025**	mg/L	0.00050	0.000093	1	03/14/14 12:00	03/17/14 15:42	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000032	1	03/14/14 12:00	03/17/14 15:42	7440-43-9	
Calcium	**120**	mg/L	0.20	0.098	10	03/14/14 12:00	03/18/14 10:51	7440-70-2	M1
Copper	**0.49**	mg/L	0.0025	0.00087	5	03/14/14 12:00	03/17/14 16:07	7440-50-8	
Iron	**3.1**	mg/L	0.050	0.0059	1	03/14/14 12:00	03/17/14 15:42	7439-89-6	
Lead	**0.0052**	mg/L	0.00010	0.000046	1	03/14/14 12:00	03/17/14 15:42	7439-92-1	
Magnesium	**39.7**	mg/L	0.025	0.012	5	03/14/14 12:00	03/17/14 16:07	7439-95-4	M1
Silver	**0.000072J**	mg/L	0.00050	0.000050	1	03/14/14 12:00	03/17/14 15:42	7440-22-4	M1
Total Hardness by 2340B	**463**	mg/L	0.71	0.36	10	03/14/14 12:00	03/18/14 10:51		
Uranium-238	**0.014**	mg/L	0.00050	0.00010	1	03/14/14 12:00	03/17/14 15:42	7440-61-1	
Zinc	**5.1**	mg/L	0.25	0.049	50	03/14/14 12:00	03/17/14 16:12	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000032J**	mg/L	0.00020	0.000030	1	03/07/14 09:35	03/10/14 16:01	7439-97-6	B

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

QC Batch: MERP/10064 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10259276001, 10259276002, 10259276003

METHOD BLANK: 1633471 Matrix: Water
Associated Lab Samples: 10259276001, 10259276002, 10259276003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000030J	0.00020	03/10/14 15:40	

LABORATORY CONTROL SAMPLE: 1633472

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0043	86	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1633473 1633474

Parameter	Units	10259276001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000031J	.005	.005	0.0047	0.0046	94	92	85-115	1	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

QC Batch: MPRP/44751 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10259276001, 10259276002, 10259276003

METHOD BLANK: 1638871 Matrix: Water
Associated Lab Samples: 10259276001, 10259276002, 10259276003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	03/17/14 14:56	
Arsenic	mg/L	ND	0.00050	03/17/14 14:56	
Cadmium	mg/L	ND	0.000080	03/17/14 14:56	
Calcium	mg/L	ND	0.020	03/18/14 10:31	
Copper	mg/L	ND	0.00050	03/18/14 10:31	
Iron	mg/L	ND	0.050	03/17/14 14:56	
Lead	mg/L	ND	0.00010	03/17/14 14:56	
Magnesium	mg/L	0.0027J	0.0050	03/17/14 14:56	
Silver	mg/L	ND	0.00050	03/17/14 14:56	
Uranium-238	mg/L	ND	0.00050	03/17/14 14:56	
Zinc	mg/L	0.0024J	0.0050	03/17/14 14:56	

LABORATORY CONTROL SAMPLE: 1638872

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.084	105	85-115	
Arsenic	mg/L	.08	0.081	102	85-115	
Cadmium	mg/L	.08	0.080	100	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.081	102	85-115	
Iron	mg/L	1	1.0	101	85-115	
Lead	mg/L	.08	0.081	101	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.082	103	85-115	
Uranium-238	mg/L	.08	0.084	105	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1638873 1638874

Parameter	Units	10259276003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.097	.08	.08	0.18	0.19	106	112	70-130	3	20	
Arsenic	mg/L	0.025	.08	.08	0.11	0.11	102	104	70-130	1	20	
Cadmium	mg/L	0.018	.08	.08	0.097	0.099	98	101	70-130	2	20	
Calcium	mg/L	120	1	1	119	120	-76	-4	70-130	.6	20	E,M1
Copper	mg/L	0.49	.08	.08	0.55	0.56	71	83	70-130	2	20	
Iron	mg/L	3.1	1	1	3.9	4.0	89	96	70-130	2	20	
Lead	mg/L	0.0052	.08	.08	0.083	0.084	97	98	70-130	2	20	
Magnesium	mg/L	39.7	1	1	38.9	39.6	-80	-8	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1638873 1638874

Parameter	Units	10259276003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	0.000072J	.08	.08	0.035	0.032	43	39	70-130	10	20	M1
Uranium-238	mg/L	0.014	.08	.08	0.093	0.095	99	101	70-130	2	20	
Zinc	mg/L	5.1	.08	.08	4.9	5.0	-218	-78	70-130	2	20	E,M1

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QUALIFIERS

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)-Revised
Pace Project No.: 10259276

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10259276001	**LAO-SS-1-022714**	EPA 200.8	MPRP/44751	EPA 200.8	ICPM/19414
10259276002	**LAO-SS-1-030314**	EPA 200.8	MPRP/44751	EPA 200.8	ICPM/19414
10259276003	**LAO-SS-2-030314**	EPA 200.8	MPRP/44751	EPA 200.8	ICPM/19414
10259276001	**LAO-SS-1-022714**	EPA 245.1	MERP/10064	EPA 245.1	MERC/11617
10259276002	**LAO-SS-1-030314**	EPA 245.1	MERP/10064	EPA 245.1	MERC/11617
10259276003	**LAO-SS-2-030314**	EPA 245.1	MERP/10064	EPA 245.1	MERC/11617

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10259276

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 - 022714	2/27/14	1545		X						2				X	X	10259276 001
	LAO-SS-1 - 030314	3/3/14	1350		X						2				X	X	002
	LAO-SS-2 - 030314	2	1400		X						1				X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: CJ Kissell

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 3/3/14

Shipment Tracking No: 8010 5778 6664

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] /PTS	3/3/14	1415	[signature] ARCP	3/4/14	1000

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP Remediation Management COC - Effective Date: starting August 16, 2011.

BP LaMP COC Rev. 8, 24 June 2012

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer

Project #: WO# : 10259276

10259276

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 8010577806 64

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☒ B88A912167S04 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.7 **Cooler Temp Corrected (°C):** 4.6 **Biological Tissue Frozen?** ☐ Yes ☐ No N/A

Temp should be above freezing to 6°C **Correction Factor:** 0.9 **Date and Initials of Person Examining Contents:** BD 3/4/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC? JB 3/4/14	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? JB 3/4/14	☒ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ½ ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed:____ Lot # of added preservative:____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1030	Temp: 3.7	Corrected Temp: 4.6
Time:	put in cooler	
Time: 1036	Temp: 3.7	Corrected Temp: 4.6

Project Manager Review: **Date:** 3/4/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

March 19, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on March 11, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10259970001	**LAO-SS-1-030614**	Water	03/06/14 11:00	03/11/14 09:30
10259970002	**LAO-SS-1-031014**	Water	03/10/14 14:45	03/11/14 09:30
10259970003	**LAO-SS-2-031014**	Water	03/10/14 14:55	03/11/14 09:30

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10259970001	**LAO-SS-1-030614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10259970002	**LAO-SS-1-031014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10259970003	**LAO-SS-2-031014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 19, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44708

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10259934001,10259934011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1637293)
  - Aluminum
  - Calcium
  - Iron
  - Silver
- MS (Lab ID: 1637295)
  - Aluminum
  - Calcium
  - Iron
  - Magnesium
- MSD (Lab ID: 1637294)
  - Aluminum
  - Calcium
  - Iron

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 19, 2014

QC Batch: MPRP/44708

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10259934001,10259934011

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Magnesium
- Silver

R1: RPD value was outside control limits.

- MSD (Lab ID: 1637294)
  - Aluminum

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: March 19, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Sample: LAO-SS-1-030614 **Lab ID: 10259970001** Collected: 03/06/14 11:00 Received: 03/11/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.012**	mg/L	0.0040	0.0015	1	03/12/14 08:26	03/13/14 19:05	7429-90-5	
Arsenic	**0.0033**	mg/L	0.00050	0.000093	1	03/12/14 08:26	03/13/14 19:05	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000032	1	03/12/14 08:26	03/13/14 19:05	7440-43-9	
Calcium	**113**	mg/L	0.20	0.098	10	03/12/14 08:26	03/13/14 19:09	7440-70-2	
Copper	**0.0073**	mg/L	0.00050	0.00017	1	03/12/14 08:26	03/13/14 19:05	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0059	1	03/12/14 08:26	03/13/14 19:05	7439-89-6	
Lead	**0.00019**	mg/L	0.00010	0.000046	1	03/12/14 08:26	03/13/14 19:05	7439-92-1	
Magnesium	**37.4**	mg/L	0.050	0.024	10	03/12/14 08:26	03/13/14 19:09	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/12/14 08:26	03/13/14 19:05	7440-22-4	
Total Hardness by 2340B	**435**	mg/L	0.71	0.36	10	03/12/14 08:26	03/13/14 19:09		
Uranium-238	**0.0083**	mg/L	0.00050	0.00010	1	03/12/14 08:26	03/13/14 19:05	7440-61-1	
Zinc	**0.054**	mg/L	0.0050	0.00098	1	03/12/14 08:26	03/13/14 19:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	03/13/14 16:15	03/17/14 14:25	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Sample: LAO-SS-1-031014 **Lab ID: 10259970002** Collected: 03/10/14 14:45 Received: 03/11/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0090**	mg/L	0.0040	0.0015	1	03/12/14 08:26	03/13/14 19:14	7429-90-5	
Arsenic	**0.0038**	mg/L	0.00050	0.000093	1	03/12/14 08:26	03/13/14 19:14	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000032	1	03/12/14 08:26	03/13/14 19:14	7440-43-9	
Calcium	**107**	mg/L	0.20	0.098	10	03/12/14 08:26	03/13/14 19:19	7440-70-2	
Copper	**0.012**	mg/L	0.00050	0.00017	1	03/12/14 08:26	03/13/14 19:14	7440-50-8	
Iron	**0.021J**	mg/L	0.050	0.0059	1	03/12/14 08:26	03/13/14 19:14	7439-89-6	
Lead	**0.00046**	mg/L	0.00010	0.000046	1	03/12/14 08:26	03/13/14 19:14	7439-92-1	
Magnesium	**42.6**	mg/L	0.050	0.024	10	03/12/14 08:26	03/13/14 19:19	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/12/14 08:26	03/13/14 19:14	7440-22-4	
Total Hardness by 2340B	**442**	mg/L	0.71	0.36	10	03/12/14 08:26	03/13/14 19:19		
Uranium-238	**0.0067**	mg/L	0.00050	0.00010	1	03/12/14 08:26	03/13/14 19:14	7440-61-1	
Zinc	**0.050**	mg/L	0.0050	0.00098	1	03/12/14 08:26	03/13/14 19:14	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000030	1	03/13/14 16:15	03/17/14 14:33	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Sample: LAO-SS-2-031014 **Lab ID: 10259970003** Collected: 03/10/14 14:55 Received: 03/11/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.30**	mg/L	0.0040	0.0015	1	03/12/14 08:26	03/13/14 19:23	7429-90-5	
Arsenic	**0.029**	mg/L	0.00050	0.000093	1	03/12/14 08:26	03/13/14 19:23	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000032	1	03/12/14 08:26	03/13/14 19:23	7440-43-9	
Calcium	**99.5**	mg/L	0.20	0.098	10	03/12/14 08:26	03/13/14 19:28	7440-70-2	
Copper	**0.62**	mg/L	0.0050	0.0017	10	03/12/14 08:26	03/13/14 19:28	7440-50-8	
Iron	**3.5**	mg/L	0.050	0.0059	1	03/12/14 08:26	03/13/14 19:23	7439-89-6	
Lead	**0.010**	mg/L	0.00010	0.000046	1	03/12/14 08:26	03/13/14 19:23	7439-92-1	
Magnesium	**30.9**	mg/L	0.050	0.024	10	03/12/14 08:26	03/13/14 19:28	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/12/14 08:26	03/13/14 19:23	7440-22-4	
Total Hardness by 2340B	**376**	mg/L	0.71	0.36	10	03/12/14 08:26	03/13/14 19:28		
Uranium-238	**0.0097**	mg/L	0.00050	0.00010	1	03/12/14 08:26	03/13/14 19:23	7440-61-1	
Zinc	**4.7**	mg/L	0.50	0.098	100	03/12/14 08:26	03/13/14 19:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000031J**	mg/L	0.00020	0.000030	1	03/13/14 16:15	03/17/14 14:35	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

QC Batch: MERP/10100 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10259970001, 10259970002, 10259970003

METHOD BLANK: 1638221 Matrix: Water
Associated Lab Samples: 10259970001, 10259970002, 10259970003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	03/17/14 13:59	

LABORATORY CONTROL SAMPLE: 1638222

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1638223 1638224

Parameter	Units	10259970001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0053	0.0054	105	108	85-115	2	20	

MATRIX SPIKE SAMPLE: 1638225

Parameter	Units	10260047010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000030J	.005	0.0053	105	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

QC Batch: MPRP/44708 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10259970001, 10259970002, 10259970003

METHOD BLANK: 1637291 Matrix: Water
Associated Lab Samples: 10259970001, 10259970002, 10259970003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	03/13/14 15:59	
Arsenic	mg/L	ND	0.00050	03/13/14 15:59	
Cadmium	mg/L	ND	0.000080	03/13/14 15:59	
Calcium	mg/L	ND	0.020	03/13/14 15:59	
Copper	mg/L	ND	0.00050	03/14/14 11:02	
Iron	mg/L	ND	0.050	03/13/14 15:59	
Lead	mg/L	ND	0.00010	03/13/14 15:59	
Magnesium	mg/L	ND	0.0050	03/13/14 15:59	
Silver	mg/L	ND	0.00050	03/13/14 15:59	
Uranium-238	mg/L	ND	0.00050	03/13/14 15:59	
Zinc	mg/L	0.0012J	0.0050	03/13/14 15:59	

LABORATORY CONTROL SAMPLE: 1637292

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.079	99	85-115	
Cadmium	mg/L	.08	0.082	103	85-115	
Calcium	mg/L	1	1.0	105	85-115	
Copper	mg/L	.08	0.080	100	85-115	
Iron	mg/L	1	1.0	103	85-115	
Lead	mg/L	.08	0.084	105	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.083	103	85-115	
Uranium-238	mg/L	.08	0.080	100	85-115	
Zinc	mg/L	.08	0.085	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1637293 1637294

Parameter	Units	10259934001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	2.3	.08	.08	3.2	4.1	1010	2240	70-130	27	20	M1,R1
Arsenic	mg/L	0.012	.08	.08	0.089	0.094	97	103	70-130	5	20	
Cadmium	mg/L	0.00062	.08	.08	0.078	0.081	97	101	70-130	4	20	
Calcium	mg/L	28500 ug/L	1	1	26.2	27.4	-232	-106	70-130	5	20	M1
Copper	mg/L	0.094	.08	.08	0.17	0.18	96	112	70-130	7	20	
Iron	mg/L	4.3	1	1	5.8	6.8	150	259	70-130	17	20	M1
Lead	mg/L	0.029	.08	.08	0.11	0.11	99	105	70-130	5	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1637293 1637294

Parameter	Units	10259934001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	22000 ug/L	1	1	23.1	24.4	115	241	70-130	5	20	M1
Silver	mg/L	ND	.08	.08	0.047	0.043	58	54	70-130	7	20	M1
Uranium-238	mg/L	3.9 ug/L	.08	.08	0.077	0.077	91	91	70-130	.3	20	
Zinc	mg/L	0.18	.08	.08	0.27	0.29	102	127	70-130	7	20	

MATRIX SPIKE SAMPLE: 1637295

Parameter	Units	10259934011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.88	.08	2.1	1530	70-130	M1
Arsenic	mg/L	0.010	.08	0.091	101	70-130	
Cadmium	mg/L	0.0013	.08	0.081	99	70-130	
Calcium	mg/L	25000 ug/L	1	24.9	-6	70-130	M1
Copper	mg/L	0.036	.08	0.11	97	70-130	
Iron	mg/L	0.87	1	2.6	172	70-130	M1
Lead	mg/L	0.019	.08	0.10	104	70-130	
Magnesium	mg/L	31300 ug/L	1	30.9	-37	70-130	M1
Silver	mg/L	0.00012J	.08	0.058	73	70-130	
Uranium-238	mg/L	0.65 ug/L	.08	0.076	95	70-130	
Zinc	mg/L	0.39	.08	0.47	107	70-130	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10259970

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10259970001	**LAO-SS-1-030614**	EPA 200.8	MPRP/44708	EPA 200.8	ICPM/19395
10259970002	**LAO-SS-1-031014**	EPA 200.8	MPRP/44708	EPA 200.8	ICPM/19395
10259970003	**LAO-SS-2-031014**	EPA 200.8	MPRP/44708	EPA 200.8	ICPM/19395
10259970001	**LAO-SS-1-030614**	EPA 245.1	MERP/10100	EPA 245.1	MERC/11638
10259970002	**LAO-SS-1-031014**	EPA 245.1	MERP/10100	EPA 245.1	MERC/11638
10259970003	**LAO-SS-2-031014**	EPA 245.1	MERP/10100	EPA 245.1	MERC/11638

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Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils | Req Due Date (mm/dd/yy): | Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) | Lab Work Order Number: 10259/7Q

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lindy Hanson

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 -030614	3/6/14	1100		X						2			X	X	10259/7Q 001
	LAO-SS-1 -031014	3/10/14	1445		X						2			X	X	9 002
	LAO-SS-2 -031014	↓	1455		X						1			X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ Renz + CJ Kissell						
Sampler's Company: Pioneer Technical Services	[signature] PTS	3/10/14	1510	[signature] PACE	3/11/14	930
Shipment Method: FedEx Ship Date: 3/10/14						
Shipment Tracking No: 8010 5778 6675						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10259970

10259970

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 801057286675

Optional: Proj. Due Date: Proj. Name:

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: _____ **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): BD 3/11/14 ~~3.2~~ 2.4 **Cooler Temp Corrected (°C):** BD 3/11/14 ~~3.9~~ 3.3 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** 0.9 **Date and Initials of Person Examining Contents:** BD 3/11/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? JT 3/12/14	☒ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1047	Temp: 2.4	Corrected Temp: 3.3	
Time: 1053	put in cooler		
Time: 1053	Temp: 2.4	Corrected Temp: 3.3	

Project Manager Review: _____ **Date:** 3/12/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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(612)607-1700

March 31, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on March 18, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10260584001	**LAO-SS-1-031314**	Water	03/13/14 12:00	03/18/14 09:46
10260584002	**LAO-SS-1-031714**	Water	03/17/14 12:45	03/18/14 09:46
10260584003	**LAO-SS-2-031714**	Water	03/17/14 12:52	03/18/14 09:46
10260584004	**LAO-SS-1T-031714**	Water	03/17/14 12:45	03/18/14 09:46
10260584005	**LAO-SS-3-031714**	Water	03/17/14 13:04	03/18/14 09:46
10260584006	**LAO-SS-4-031714**	Water	03/17/14 13:15	03/18/14 09:46
10260584007	**LAO-SS-A2-031714**	Water	03/17/14 11:15	03/18/14 09:46
10260584008	**LAO-SS-A3-031714**	Water	03/17/14 11:18	03/18/14 09:46
10260584009	**LAO-SS-SBC-01-031714**	Water	03/17/14 11:21	03/18/14 09:46
10260584010	**LAO-SS-06G-031714**	Water	03/17/14 11:32	03/18/14 09:46
10260584011	**LAO-SS-06F-031714**	Water	03/17/14 11:25	03/18/14 09:46

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10260584001	**LAO-SS-1-031314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10260584002	**LAO-SS-1-031714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10260584003	**LAO-SS-2-031714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10260584004	**LAO-SS-1T-031714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10260584005	**LAO-SS-3-031714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10260584006	**LAO-SS-4-031714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	HNKH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10260584007	**LAO-SS-A2-031714**	SM 2320B	PH1	1	PASI-M
10260584008	**LAO-SS-A3-031714**	SM 2320B	PH1	1	PASI-M
10260584009	**LAO-SS-SBC-01-031714**	SM 2320B	PH1	1	PASI-M
10260584010	**LAO-SS-06G-031714**	SM 2320B	PH1	1	PASI-M
10260584011	**LAO-SS-06F-031714**	SM 2320B	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 31, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44817

B: Analyte was detected in the associated method blank.

- BLANK for HBN 289878 [MPRP/448 (Lab ID: 1641998)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44817

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10260584001,10260744005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1642000)
  - Calcium
  - Magnesium
  - Silver
- MS (Lab ID: 1642002)
  - Aluminum
  - Calcium
- MSD (Lab ID: 1642001)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: March 31, 2014

QC Batch: MPRP/44817

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10260584001,10260744005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Magnesium
- Silver

Additional Comments:

Analyte Comments:

QC Batch: MPRP/44817

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1642000)
  - Calcium
- MSD (Lab ID: 1642001)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: March 31, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/10127

B: Analyte was detected in the associated method blank.

- BLANK for HBN 289890 [MERP/101 (Lab ID: 1642068)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: March 31, 2014

General Information:
10 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: March 31, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: March 31, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/34719

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1641851)
  - Total Suspended Solids

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: March 31, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-1-031314 **Lab ID: 10260584001** Collected: 03/13/14 12:00 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.012**	mg/L	0.0040	0.0015	1	03/21/14 08:52	03/21/14 20:13	7429-90-5	
Arsenic	**0.0036**	mg/L	0.00050	0.000093	1	03/21/14 08:52	03/21/14 20:13	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000032	1	03/21/14 08:52	03/21/14 20:13	7440-43-9	
Calcium	**95.8**	mg/L	0.10	0.049	5	03/21/14 08:52	03/21/14 20:38	7440-70-2	M1
Copper	**0.017**	mg/L	0.00050	0.00017	1	03/21/14 08:52	03/21/14 20:13	7440-50-8	
Iron	**0.031J**	mg/L	0.050	0.0059	1	03/21/14 08:52	03/21/14 20:13	7439-89-6	
Lead	**0.00038**	mg/L	0.00010	0.000046	1	03/21/14 08:52	03/21/14 20:13	7439-92-1	
Magnesium	**34.8**	mg/L	0.025	0.012	5	03/21/14 08:52	03/21/14 20:38	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000050	1	03/21/14 08:52	03/24/14 11:49	7440-22-4	M1
Total Hardness by 2340B	**383**	mg/L	0.36	0.18	5	03/21/14 08:52	03/21/14 20:38		
Uranium-238	**0.0050**	mg/L	0.00050	0.00010	1	03/21/14 08:52	03/21/14 20:13	7440-61-1	
Zinc	**0.054**	mg/L	0.0050	0.00098	1	03/21/14 08:52	03/21/14 20:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000055J**	mg/L	0.00020	0.000030	1	03/21/14 12:51	03/24/14 15:54	7439-97-6	B

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-1-031714 **Lab ID: 10260584002** Collected: 03/17/14 12:45 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0088**	mg/L	0.0040	0.0015	1	03/21/14 08:52	03/21/14 20:47	7429-90-5	
Arsenic	**0.0027**	mg/L	0.00050	0.000093	1	03/21/14 08:52	03/21/14 20:47	7440-38-2	
Cadmium	**0.00019**	mg/L	0.000080	0.000032	1	03/21/14 08:52	03/21/14 20:47	7440-43-9	
Calcium	**99.9**	mg/L	0.20	0.098	10	03/21/14 08:52	03/21/14 20:52	7440-70-2	
Copper	**0.014**	mg/L	0.00050	0.00017	1	03/21/14 08:52	03/21/14 20:47	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0059	1	03/21/14 08:52	03/21/14 20:47	7439-89-6	
Lead	**0.00029**	mg/L	0.00010	0.000046	1	03/21/14 08:52	03/21/14 20:47	7439-92-1	
Magnesium	**32.2**	mg/L	0.050	0.024	10	03/21/14 08:52	03/21/14 20:52	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/21/14 08:52	03/24/14 12:03	7440-22-4	
Total Hardness by 2340B	**382**	mg/L	0.71	0.36	10	03/21/14 08:52	03/21/14 20:52		
Uranium-238	**0.0045**	mg/L	0.00050	0.00010	1	03/21/14 08:52	03/21/14 20:47	7440-61-1	
Zinc	**0.049**	mg/L	0.0050	0.00098	1	03/21/14 08:52	03/21/14 20:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000054J**	mg/L	0.00020	0.000030	1	03/21/14 12:51	03/24/14 15:56	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**44.0**	mg/L	5.0	2.5	1		03/20/14 15:29		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**665**	mg/L	10.0	5.0	1		03/24/14 12:16		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		03/20/14 09:27		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.75**	mg/L	0.10	0.050	1		03/19/14 11:26		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-2-031714 **Lab ID: 10260584003** Collected: 03/17/14 12:52 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.45**	mg/L	0.0040	0.0015	1	03/21/14 08:52	03/21/14 21:17	7429-90-5	
Arsenic	**0.042**	mg/L	0.00050	0.000093	1	03/21/14 08:52	03/21/14 21:17	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000032	1	03/21/14 08:52	03/21/14 21:17	7440-43-9	
Calcium	**117**	mg/L	0.20	0.098	10	03/21/14 08:52	03/21/14 21:22	7440-70-2	
Copper	**1.1**	mg/L	0.0050	0.0017	10	03/21/14 08:52	03/21/14 21:22	7440-50-8	
Iron	**6.1**	mg/L	0.050	0.0059	1	03/21/14 08:52	03/21/14 21:17	7439-89-6	
Lead	**0.019**	mg/L	0.00010	0.000046	1	03/21/14 08:52	03/21/14 21:17	7439-92-1	
Magnesium	**33.4**	mg/L	0.050	0.024	10	03/21/14 08:52	03/21/14 21:22	7439-95-4	
Silver	**0.00018J**	mg/L	0.00050	0.000050	1	03/21/14 08:52	03/24/14 12:17	7440-22-4	
Total Hardness by 2340B	**429**	mg/L	0.71	0.36	10	03/21/14 08:52	03/21/14 21:22		
Uranium-238	**0.012**	mg/L	0.00050	0.00010	1	03/21/14 08:52	03/21/14 21:17	7440-61-1	
Zinc	**5.8**	mg/L	0.25	0.049	50	03/21/14 08:52	03/24/14 12:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00028**	mg/L	0.00020	0.000030	1	03/21/14 12:51	03/24/14 15:59	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**91.3**	mg/L	5.0	2.5	1		03/20/14 15:33		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**729**	mg/L	10.0	5.0	1		03/24/14 12:16		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11.0**	mg/L	10.0	5.0	1		03/20/14 09:27		D8
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.80**	mg/L	0.10	0.050	1		03/19/14 11:30		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-1T-031714 **Lab ID: 10260584004** Collected: 03/17/14 12:45 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0096**	mg/L	0.0040	0.0015	1	03/21/14 08:52	03/21/14 21:27	7429-90-5	
Arsenic	**0.0028**	mg/L	0.00050	0.000093	1	03/21/14 08:52	03/21/14 21:27	7440-38-2	
Cadmium	**0.00022**	mg/L	0.000080	0.000032	1	03/21/14 08:52	03/21/14 21:27	7440-43-9	
Calcium	**97.6**	mg/L	0.20	0.098	10	03/21/14 08:52	03/21/14 21:32	7440-70-2	
Copper	**0.015**	mg/L	0.00050	0.00017	1	03/21/14 08:52	03/21/14 21:27	7440-50-8	
Iron	**0.029J**	mg/L	0.050	0.0059	1	03/21/14 08:52	03/21/14 21:27	7439-89-6	
Lead	**0.00040**	mg/L	0.00010	0.000046	1	03/21/14 08:52	03/21/14 21:27	7439-92-1	
Magnesium	**31.2**	mg/L	0.050	0.024	10	03/21/14 08:52	03/21/14 21:32	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/21/14 08:52	03/24/14 12:08	7440-22-4	
Total Hardness by 2340B	**372**	mg/L	0.71	0.36	10	03/21/14 08:52	03/21/14 21:32		
Uranium-238	**0.0044**	mg/L	0.00050	0.00010	1	03/21/14 08:52	03/21/14 21:27	7440-61-1	
Zinc	**0.051**	mg/L	0.0050	0.00098	1	03/21/14 08:52	03/21/14 21:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000053J**	mg/L	0.00020	0.000030	1	03/21/14 12:51	03/24/14 16:11	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**44.2**	mg/L	5.0	2.5	1		03/20/14 15:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**648**	mg/L	10.0	5.0	1		03/24/14 12:17		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		03/20/14 09:27		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.78**	mg/L	0.10	0.050	1		03/19/14 11:31		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-3-031714 **Lab ID: 10260584005** Collected: 03/17/14 13:04 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.40**	mg/L	0.0040	0.0015	1	03/21/14 08:52	03/21/14 21:45	7429-90-5	
Arsenic	**0.0030**	mg/L	0.00050	0.000093	1	03/21/14 08:52	03/21/14 21:45	7440-38-2	
Cadmium	**0.033**	mg/L	0.000080	0.000032	1	03/21/14 08:52	03/21/14 21:45	7440-43-9	
Calcium	**122**	mg/L	0.20	0.098	10	03/21/14 08:52	03/21/14 21:50	7440-70-2	
Copper	**2.0**	mg/L	0.0050	0.0017	10	03/21/14 08:52	03/21/14 21:50	7440-50-8	
Iron	**9.8**	mg/L	0.050	0.0059	1	03/21/14 08:52	03/21/14 21:45	7439-89-6	
Lead	**0.0019**	mg/L	0.00010	0.000046	1	03/21/14 08:52	03/21/14 21:45	7439-92-1	
Magnesium	**35.5**	mg/L	0.050	0.024	10	03/21/14 08:52	03/21/14 21:50	7439-95-4	
Silver	**0.000055J**	mg/L	0.00050	0.000050	1	03/21/14 08:52	03/24/14 12:12	7440-22-4	
Total Hardness by 2340B	**452**	mg/L	0.71	0.36	10	03/21/14 08:52	03/21/14 21:50		
Uranium-238	**0.011**	mg/L	0.00050	0.00010	1	03/21/14 08:52	03/21/14 21:45	7440-61-1	
Zinc	**7.8**	mg/L	0.50	0.098	100	03/21/14 08:52	03/21/14 21:55	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000057J**	mg/L	0.00020	0.000030	1	03/21/14 12:51	03/24/14 16:14	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**62.8**	mg/L	5.0	2.5	1		03/20/14 15:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**828**	mg/L	10.0	5.0	1		03/24/14 12:20		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**25.0**	mg/L	10.0	5.0	1		03/20/14 09:27		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		03/19/14 11:31		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-4-031714 **Lab ID: 10260584006** Collected: 03/17/14 13:15 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0026J**	mg/L	0.0040	0.0015	1	03/21/14 08:52	03/21/14 21:12	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.000093	1	03/21/14 08:52	03/21/14 21:12	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000032	1	03/21/14 08:52	03/21/14 21:12	7440-43-9	
Calcium	ND	mg/L	0.020	0.0098	1	03/21/14 08:52	03/21/14 21:12	7440-70-2	
Copper	**0.00019J**	mg/L	0.00050	0.00017	1	03/21/14 08:52	03/21/14 21:12	7440-50-8	
Iron	ND	mg/L	0.050	0.0059	1	03/21/14 08:52	03/21/14 21:12	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	03/21/14 08:52	03/21/14 21:12	7439-92-1	
Magnesium	ND	mg/L	0.0050	0.0024	1	03/21/14 08:52	03/21/14 21:12	7439-95-4	
Silver	ND	mg/L	0.00050	0.000050	1	03/21/14 08:52	03/24/14 12:42	7440-22-4	
Total Hardness by 2340B	ND	mg/L	0.071	0.036	1	03/21/14 08:52	03/21/14 21:12		
Uranium-238	ND	mg/L	0.00050	0.00010	1	03/21/14 08:52	03/21/14 21:12	7440-61-1	
Zinc	**0.0025J**	mg/L	0.0050	0.00098	1	03/21/14 08:52	03/21/14 21:12	7440-66-6	B
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000049J**	mg/L	0.00020	0.000030	1	03/21/14 12:51	03/24/14 16:16	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		03/20/14 15:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**14.0**	mg/L	10.0	5.0	1		03/24/14 12:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		03/20/14 09:27		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		03/19/14 11:35		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-A2-031714 **Lab ID: 10260584007** Collected: 03/17/14 11:15 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**48.8**	mg/L	5.0	2.5	1		03/24/14 11:35		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-A3-031714 **Lab ID: 10260584008** Collected: 03/17/14 11:18 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**44.3**	mg/L	5.0	2.5	1		03/20/14 16:02		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-SBC-01-031714 **Lab ID: 10260584009** Collected: 03/17/14 11:21 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**70.9**	mg/L	5.0	2.5	1		03/20/14 16:16		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-06G-031714 **Lab ID: 10260584010** Collected: 03/17/14 11:32 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**69.6**	mg/L	5.0	2.5	1		03/20/14 16:20		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Sample: LAO-SS-06F-031714 **Lab ID: 10260584011** Collected: 03/17/14 11:25 Received: 03/18/14 09:46 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**69.8**	mg/L	5.0	2.5	1		03/20/14 16:24		

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: MERP/10127 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10260584001, 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

METHOD BLANK: 1642068 Matrix: Water
Associated Lab Samples: 10260584001, 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000050J	0.00020	03/24/14 15:49	

LABORATORY CONTROL SAMPLE: 1642069

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1642070 1642071

Parameter	Units	10260584003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00028	.005	.005	0.0050	0.0050	93	94	85-115	.2	20	

MATRIX SPIKE SAMPLE: 1642072

Parameter	Units	10260744013 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.000057J	.005	0.0045	89	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: MPRP/44817 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10260584001, 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

METHOD BLANK: 1641998 Matrix: Water
Associated Lab Samples: 10260584001, 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.0040	03/21/14 20:08	
Arsenic	mg/L	ND	0.00050	03/21/14 20:08	
Cadmium	mg/L	ND	0.000080	03/21/14 20:08	
Calcium	mg/L	ND	0.020	03/21/14 20:08	
Copper	mg/L	ND	0.00050	03/21/14 20:08	
Iron	mg/L	ND	0.050	03/21/14 20:08	
Lead	mg/L	ND	0.00010	03/21/14 20:08	
Magnesium	mg/L	0.0025J	0.0050	03/21/14 20:08	
Silver	mg/L	ND	0.00050	03/24/14 11:44	
Uranium-238	mg/L	ND	0.00050	03/21/14 20:08	
Zinc	mg/L	0.0015J	0.0050	03/24/14 11:44	

LABORATORY CONTROL SAMPLE: 1641999

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.073	92	85-115	
Arsenic	mg/L	.08	0.077	96	85-115	
Cadmium	mg/L	.08	0.077	97	85-115	
Calcium	mg/L	1	0.95	95	85-115	
Copper	mg/L	.08	0.079	99	85-115	
Iron	mg/L	1	0.96	96	85-115	
Lead	mg/L	.08	0.078	97	85-115	
Magnesium	mg/L	1	0.99	99	85-115	
Silver	mg/L	.08	0.081	101	85-115	
Uranium-238	mg/L	.08	0.078	97	85-115	
Zinc	mg/L	.08	0.078	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1642000 1642001

Parameter	Units	10260584001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.012	.08	.08	0.083	0.081	88	86	70-130	2	20	
Arsenic	mg/L	0.0036	.08	.08	0.087	0.085	105	102	70-130	3	20	
Cadmium	mg/L	0.00020	.08	.08	0.072	0.073	89	90	70-130	1	20	
Calcium	mg/L	95.8	1	1	96.1	91.7	33	-403	70-130	5	20	E,M1
Copper	mg/L	0.017	.08	.08	0.089	0.089	89	90	70-130	.07	20	
Iron	mg/L	0.031J	1	1	0.90	0.91	86	88	70-130	2	20	
Lead	mg/L	0.00038	.08	.08	0.068	0.069	85	86	70-130	1	20	
Magnesium	mg/L	34.8	1	1	35.1	33.6	22	-124	70-130	4	20	M1
Silver	mg/L	ND	.08	.08	0.034	0.033	42	41	70-130	4	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1642000 1642001

Parameter	Units	10260584001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0050	.08	.08	0.075	0.077	88	90	70-130	2	20	
Zinc	mg/L	0.054	.08	.08	0.13	0.13	95	92	70-130	2	20	

MATRIX SPIKE SAMPLE: 1642002

Parameter	Units	10260744005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.43	.08	0.68	310	70-130	M1
Arsenic	mg/L	0.0067	.08	0.090	104	70-130	
Cadmium	mg/L	0.00014	.08	0.083	104	70-130	
Calcium	mg/L	32600 ug/L	1	29.4	-326	70-130	M1
Copper	mg/L	0.014	.08	0.096	103	70-130	
Iron	mg/L	0.82	1	1.9	106	70-130	
Lead	mg/L	0.0030	.08	0.083	100	70-130	
Magnesium	mg/L	7410 ug/L	1	8.5	108	70-130	
Silver	mg/L	ND	.08	0.079	99	70-130	
Uranium-238	mg/L	3.0 ug/L	.08	0.083	100	70-130	
Zinc	mg/L	0.038	.08	0.12	106	70-130	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: WET/34718 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006, 10260584008, 10260584009, 10260584010, 10260584011

METHOD BLANK: 1641842 — Matrix: Water
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006, 10260584008, 10260584009, 10260584010, 10260584011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	03/20/14 14:07	

LABORATORY CONTROL SAMPLE & LCSD: 1641843 1641844

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.5	40.6	101	102	90-110	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1641845 1641846

Parameter	Units	10260739009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	329	40	40	373	373	112	112	80-120	.01	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1641847 1641848

Parameter	Units	10260584008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	44.3	40	40	83.8	84.3	99	100	80-120	.5	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: WET/34749 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10260584007

METHOD BLANK: 1643482 | Matrix: Water
Associated Lab Samples: 10260584007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	03/24/14 11:22	

LABORATORY CONTROL SAMPLE & LCSD: 1643483 1643484

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.7	41.0	102	102	90-110	.6	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1643485 1643486

Parameter	Units	10260876001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	185	40	40	227	222	105	93	80-120	2	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1643487 1643488

Parameter	Units	10260744009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	77.9	40	40	116	118	96	100	80-120	1	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: WET/34743 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

METHOD BLANK: 1643317 Matrix: Water
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	03/24/14 12:17	

LABORATORY CONTROL SAMPLE: 1643318

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	984	98	80-120	

SAMPLE DUPLICATE: 1643319

Parameter	Units	10260584002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	665	696	5	10	

SAMPLE DUPLICATE: 1643320

Parameter	Units	10260739009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2870	2820	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: WET/34719 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

METHOD BLANK: 1641849 Matrix: Water
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	03/20/14 09:26	

LABORATORY CONTROL SAMPLE: 1641850

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	98.0	98	80-120	

SAMPLE DUPLICATE: 1641851

Parameter	Units	10260584003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	11.0	13.0	17	10	D8

SAMPLE DUPLICATE: 1641852

Parameter	Units	10260607001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

QC Batch: WETA/17556 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

METHOD BLANK: 1640640 | Matrix: Water
Associated Lab Samples: 10260584002, 10260584003, 10260584004, 10260584005, 10260584006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	03/19/14 11:11	

LABORATORY CONTROL SAMPLE: 1640641

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1640642 1640643

Parameter	Units	10260047001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.55	2.5	2.5	2.9	2.8	94	88	80-120	5	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1641243 1641244

Parameter	Units	10260584006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	2.6	2.6	103	105	80-120	1	30	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10260584

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10260584001	**LAO-SS-1-031314**	EPA 200.8	MPRP/44817	EPA 200.8	ICPM/19453
10260584002	**LAO-SS-1-031714**	EPA 200.8	MPRP/44817	EPA 200.8	ICPM/19453
10260584003	**LAO-SS-2-031714**	EPA 200.8	MPRP/44817	EPA 200.8	ICPM/19453
10260584004	**LAO-SS-1T-031714**	EPA 200.8	MPRP/44817	EPA 200.8	ICPM/19453
10260584005	**LAO-SS-3-031714**	EPA 200.8	MPRP/44817	EPA 200.8	ICPM/19453
10260584006	**LAO-SS-4-031714**	EPA 200.8	MPRP/44817	EPA 200.8	ICPM/19453
10260584001	**LAO-SS-1-031314**	EPA 245.1	MERP/10127	EPA 245.1	MERC/11674
10260584002	**LAO-SS-1-031714**	EPA 245.1	MERP/10127	EPA 245.1	MERC/11674
10260584003	**LAO-SS-2-031714**	EPA 245.1	MERP/10127	EPA 245.1	MERC/11674
10260584004	**LAO-SS-1T-031714**	EPA 245.1	MERP/10127	EPA 245.1	MERC/11674
10260584005	**LAO-SS-3-031714**	EPA 245.1	MERP/10127	EPA 245.1	MERC/11674
10260584006	**LAO-SS-4-031714**	EPA 245.1	MERP/10127	EPA 245.1	MERC/11674
10260584002	**LAO-SS-1-031714**	SM 2320B	WET/34718		
10260584003	**LAO-SS-2-031714**	SM 2320B	WET/34718		
10260584004	**LAO-SS-1T-031714**	SM 2320B	WET/34718		
10260584005	**LAO-SS-3-031714**	SM 2320B	WET/34718		
10260584006	**LAO-SS-4-031714**	SM 2320B	WET/34718		
10260584007	**LAO-SS-A2-031714**	SM 2320B	WET/34749		
10260584008	**LAO-SS-A3-031714**	SM 2320B	WET/34718		
10260584009	**LAO-SS-SBC-01-031714**	SM 2320B	WET/34718		
10260584010	**LAO-SS-06G-031714**	SM 2320B	WET/34718		
10260584011	**LAO-SS-06F-031714**	SM 2320B	WET/34718		
10260584002	**LAO-SS-1-031714**	SM 2540C	WET/34743		
10260584003	**LAO-SS-2-031714**	SM 2540C	WET/34743		
10260584004	**LAO-SS-1T-031714**	SM 2540C	WET/34743		
10260584005	**LAO-SS-3-031714**	SM 2540C	WET/34743		
10260584006	**LAO-SS-4-031714**	SM 2540C	WET/34743		
10260584002	**LAO-SS-1-031714**	SM 2540D	WET/34719		
10260584003	**LAO-SS-2-031714**	SM 2540D	WET/34719		
10260584004	**LAO-SS-1T-031714**	SM 2540D	WET/34719		
10260584005	**LAO-SS-3-031714**	SM 2540D	WET/34719		
10260584006	**LAO-SS-4-031714**	SM 2540D	WET/34719		
10260584002	**LAO-SS-1-031714**	SM 4500-NO3 H	WETA/17556		
10260584003	**LAO-SS-2-031714**	SM 4500-NO3 H	WETA/17556		
10260584004	**LAO-SS-1T-031714**	SM 4500-NO3 H	WETA/17556		
10260584005	**LAO-SS-3-031714**	SM 4500-NO3 H	WETA/17556		
10260584006	**LAO-SS-4-031714**	SM 4500-NO3 H	WETA/17556		

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x
BP Facility No: LAO Wetlands (Weekly)
Lab Work Order Number: 10260584

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burmiester
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Alkalinity	Nitrate/Nitrite					Comments
	LAO-SS-1-031314	3/13/14	1200		X			2			2				X			X							10260584 001
	LAO-SS-1-031714	3/17/14	1245		X			4	X	1	2				X			X		X					002
	LAO-SS-2-031714		1252		X			3	1	1	1				X					X					003
	LAO-SS-1T-031714		1245		X			3	1	1	1				X					X					004
	LAO-SS-3-031714		1304		X			3	1	1	1				X					X					005
	LAO-SS-4-031714		1315		X			3	1	1	1				X					X					006
	LAO-SS-A2-031714		1115		X			1	1	1	1								X						007
	LAO-SS-A3-031714		1118		X			1	1	1	1								X						008
	LAO-SS-SBC-01-031714		1121		X			1	1	1	1								X						009
	LAO-SS-06G-031714		1132		X			1	1	1	1								X						010

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell + BT Renz						
Sampler's Company: Pioneer Technical Services	[signature] PTS	3/17/14	1300	[signature] Pace	3/18/14	09:46
Shipment Method: Fed Ex Ship Date: 3/17/14						
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place (Yes) No | Temp Blank: Yes (No) | Cooler Temp on Receipt: 2.0 °F (C) | Trip Blank: Yes (No) | MS/MSD Sample Submitted: Yes (No)

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils | Req Due Date (mm/dd/yy): | Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) | Lab Work Order Number: 10260584

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burmeister

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Alkalinity						Comments
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS-1~~				X						2				X			X							
	~~LAO-SS~~-2				X						1				X										
	LAO-SS-06F-031714	3/17/14	1125					1	1										X						011

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell / DS Kent						
Sampler's Company: Pioneer Technical Services	IPTS	3/17/14	1320	Pace	3/18/14	09:40
Shipment Method: Fed Ex Ship Date:						
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP. Pioneer

Project #: WO#: 10260584

10260584

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other:

Tracking Number: 8046 3188 5953

Custody Seal on Cooler/Box Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Optional: Proj. Due Date: Proj. Name:

Packing Material: [X] Bubble Wrap [ ] Bubble Bags [ ] None [ ] Other: **Temp Blank?** [ ] Yes [X] No

Thermom. Used: [X] B88A912167504 [ ] 80512447 [ ] 72337080 **Type of Ice:** [X] Wet [ ] Blue [ ] None [ ] Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.1 **Cooler Temp Corrected (°C):** 2.0 **Biological Tissue Frozen?** [ ] Yes [ ] No

Temp should be above freezing to 6°C **Correction Factor:** Add 0.9 **Date and Initials of Person Examining Contents:** 3/18/14 JE

				Comments:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Chain of Custody Filled Out?	[X] Yes	[ ] No	[ ] N/A	2.
Chain of Custody Relinquished?	[X] Yes	[ ] No	[ ] N/A	3.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	4.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	5.
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[X] No	[ ] N/A	6.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	[ ] Yes	[ ] No	[X] N/A	8.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	9.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	10.
Filtered Volume Received for Dissolved Tests?	[X] Yes	[ ] No	[ ] N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	[X] Yes	[ ] No	[ ] N/A	12.
All containers needing acid/base preservation have been checked?	[X] Yes	[ ] No	[ ] N/A	13. [X] HNO_3 [X] H_2SO_4 [ ] NaOH [ ] HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	[X] Yes	[ ] No	[ ] N/A	Sample # SS-1 3/3 2of2 / SS13-17 2of2 1of1 / SS-2, SS15 1of1 / SS-3, SS-4 1of1
Per method, VOA pH is checked after analysis				Initial when completed: JE Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	[ ] Yes	[ ] No	[X] N/A	14.
3 Trip Blanks Present?	[ ] Yes	[ ] No	[X] N/A	15.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: Brad Hollamon Date/Time: 3/1

Comments/Resolution: samples 002-006 should have TDS/TSS; ~~Alk~~ Alkalinity on them to. We received 3/18/14 bottles for them but no test on the COC.

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 11:09	Temp: 1.1	Corrected Temp: 2.0	
Time: 11:16	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: [signature] **Date:** 3/18/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

April 09, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on March 25, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10261270001	**LAO-SS-1-032014**	Water	03/20/14 13:00	03/25/14 09:30
10261270002	**LAO-SS-1-032414**	Water	03/24/14 13:50	03/25/14 09:30
10261270003	**LAO-SS-2-032414**	Water	03/24/14 14:00	03/25/14 09:30

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10261270001	**LAO-SS-1-032014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10261270002	**LAO-SS-1-032414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10261270003	**LAO-SS-2-032414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 09, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/44988

B: Analyte was detected in the associated method blank.

- BLANK for HBN 291318 [MPRP/449 (Lab ID: 1649950)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/44988

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10261270003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1649952)
  - Calcium
  - Copper
  - Magnesium
  - Zinc
- MSD (Lab ID: 1649953)
  - Calcium
  - Copper
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 09, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/44988

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1649952)
  - Calcium
- MSD (Lab ID: 1649953)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: April 09, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Sample: LAO-SS-1-032014 **Lab ID: 10261270001** Collected: 03/20/14 13:00 Received: 03/25/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.012**	mg/L	0.010	0.0012	1	04/03/14 13:34	04/08/14 14:34	7429-90-5	B
Arsenic	**0.0026**	mg/L	0.00050	0.00025	1	04/03/14 13:34	04/08/14 14:34	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	04/03/14 13:34	04/08/14 14:34	7440-43-9	
Calcium	**92.2**	mg/L	0.40	0.084	10	04/03/14 13:34	04/09/14 14:26	7440-70-2	
Copper	**0.012**	mg/L	0.0010	0.00022	1	04/03/14 13:34	04/08/14 14:34	7440-50-8	
Iron	**0.74**	mg/L	0.050	0.0080	1	04/03/14 13:34	04/08/14 14:34	7439-89-6	
Lead	**0.00022**	mg/L	0.00010	0.000046	1	04/03/14 13:34	04/08/14 14:34	7439-92-1	
Magnesium	**28.4**	mg/L	0.10	0.028	10	04/03/14 13:34	04/08/14 14:39	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/03/14 13:34	04/08/14 14:34	7440-22-4	
Total Hardness by 2340B	**347**	mg/L	0.71	0.36	10	04/03/14 13:34	04/09/14 14:26		
Uranium-238	**0.0048**	mg/L	0.00050	0.00025	1	04/03/14 13:34	04/08/14 14:34	7440-61-1	
Zinc	**0.038**	mg/L	0.0050	0.0025	1	04/03/14 13:34	04/08/14 14:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/02/14 11:00	04/03/14 13:21	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Sample: LAO-SS-1-032414 **Lab ID: 10261270002** Collected: 03/24/14 13:50 Received: 03/25/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0094J**	mg/L	0.010	0.0012	1	04/03/14 13:34	04/08/14 14:43	7429-90-5	B
Arsenic	**0.0028**	mg/L	0.00050	0.00025	1	04/03/14 13:34	04/08/14 14:43	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	04/03/14 13:34	04/08/14 14:43	7440-43-9	
Calcium	**109**	mg/L	0.40	0.084	10	04/03/14 13:34	04/09/14 14:35	7440-70-2	
Copper	**0.0098**	mg/L	0.0010	0.00022	1	04/03/14 13:34	04/08/14 14:43	7440-50-8	
Iron	**0.048J**	mg/L	0.050	0.0080	1	04/03/14 13:34	04/08/14 14:43	7439-89-6	
Lead	**0.00026**	mg/L	0.00010	0.000046	1	04/03/14 13:34	04/08/14 14:43	7439-92-1	
Magnesium	**32.2**	mg/L	0.10	0.028	10	04/03/14 13:34	04/08/14 14:48	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/03/14 13:34	04/08/14 14:43	7440-22-4	
Total Hardness by 2340B	**404**	mg/L	0.71	0.36	10	04/03/14 13:34	04/09/14 14:35		
Uranium-238	**0.0059**	mg/L	0.00050	0.00025	1	04/03/14 13:34	04/08/14 14:43	7440-61-1	
Zinc	**0.040**	mg/L	0.0050	0.0025	1	04/03/14 13:34	04/08/14 14:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/02/14 11:00	04/03/14 13:24	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Sample: LAO-SS-2-032414 **Lab ID: 10261270003** Collected: 03/24/14 14:00 Received: 03/25/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.082**	mg/L	0.010	0.0012	1	04/03/14 13:34	04/08/14 13:36	7429-90-5	
Arsenic	**0.015**	mg/L	0.00050	0.00025	1	04/03/14 13:34	04/08/14 13:36	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000033	1	04/03/14 13:34	04/08/14 13:36	7440-43-9	
Calcium	**120**	mg/L	0.40	0.084	10	04/03/14 13:34	04/09/14 14:39	7440-70-2	M1
Copper	**0.45**	mg/L	0.0010	0.00022	1	04/03/14 13:34	04/08/14 13:36	7440-50-8	M1
Iron	**2.2**	mg/L	0.050	0.0080	1	04/03/14 13:34	04/08/14 13:36	7439-89-6	
Lead	**0.0044**	mg/L	0.00010	0.000046	1	04/03/14 13:34	04/08/14 13:36	7439-92-1	
Magnesium	**32.7**	mg/L	0.050	0.014	5	04/03/14 13:34	04/08/14 14:01	7439-95-4	M1
Silver	**0.00014J**	mg/L	0.00050	0.000056	1	04/03/14 13:34	04/08/14 13:36	7440-22-4	
Total Hardness by 2340B	**434**	mg/L	0.71	0.36	10	04/03/14 13:34	04/09/14 14:39		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	04/03/14 13:34	04/08/14 13:36	7440-61-1	
Zinc	**5.8**	mg/L	0.25	0.12	50	04/03/14 13:34	04/08/14 14:05	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/02/14 11:00	04/03/14 13:31	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

QC Batch: MERP/10168 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10261270001, 10261270002, 10261270003

METHOD BLANK: 1646688 Matrix: Water
Associated Lab Samples: 10261270001, 10261270002, 10261270003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	04/03/14 13:04	

LABORATORY CONTROL SAMPLE: 1646689

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0045	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1646690 1646691

Parameter	Units	10261262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0056	0.0053	112	106	85-115	6	20	

MATRIX SPIKE SAMPLE: 1646692

Parameter	Units	10261512001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0056	111	85-115	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

QC Batch: MPRP/44988 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10261270001, 10261270002, 10261270003

METHOD BLANK: 1649950 Matrix: Water
Associated Lab Samples: 10261270001, 10261270002, 10261270003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0019J	0.010	04/08/14 13:27	
Arsenic	mg/L	ND	0.00050	04/08/14 13:27	
Cadmium	mg/L	ND	0.000080	04/08/14 13:27	
Calcium	mg/L	ND	0.040	04/09/14 14:31	
Copper	mg/L	0.00031J	0.0010	04/08/14 13:27	
Iron	mg/L	ND	0.050	04/09/14 14:31	
Lead	mg/L	ND	0.00010	04/08/14 13:27	
Magnesium	mg/L	ND	0.010	04/08/14 13:27	
Silver	mg/L	ND	0.00050	04/08/14 13:27	
Uranium-238	mg/L	ND	0.00050	04/08/14 13:27	
Zinc	mg/L	0.0034J	0.0050	04/08/14 13:27	

LABORATORY CONTROL SAMPLE: 1649951

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.080	100	85-115	
Arsenic	mg/L	.08	0.079	98	85-115	
Cadmium	mg/L	.08	0.077	96	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.079	98	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.079	99	85-115	
Magnesium	mg/L	1	0.99	99	85-115	
Silver	mg/L	.08	0.077	96	85-115	
Uranium-238	mg/L	.08	0.077	96	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1649952 1649953

Parameter	Units	10261270003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.082	.08	.08	0.18	0.18	124	123	70-130	.7	20	
Arsenic	mg/L	0.015	.08	.08	0.099	0.095	105	101	70-130	4	20	
Cadmium	mg/L	0.019	.08	.08	0.10	0.097	103	96	70-130	5	20	
Calcium	mg/L	120	1	1	124	124	434	410	70-130	.2	20	E,M1
Copper	mg/L	0.45	.08	.08	0.56	0.56	141	132	70-130	1	20	M1
Iron	mg/L	2.2	1	1	3.4	3.3	120	109	70-130	3	20	
Lead	mg/L	0.0044	.08	.08	0.089	0.085	106	101	70-130	5	20	
Magnesium	mg/L	32.7	1	1	34.6	33.9	187	113	70-130	2	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1649952 1649953

Parameter	Units	10261270003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	0.00014 J	.08	.08	0.080	0.075	99	94	70-130	6	20	
Uranium-238	mg/L	0.011	.08	.08	0.095	0.091	105	100	70-130	4	20	
Zinc	mg/L	5.8	.08	.08	5.8	5.7	32	-75	70-130	1	20	M1

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261270

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10261270001	**LAO-SS-1-032014**	EPA 200.8	MPRP/44988	EPA 200.8	ICPM/19554
10261270002	**LAO-SS-1-032414**	EPA 200.8	MPRP/44988	EPA 200.8	ICPM/19554
10261270003	**LAO-SS-2-032414**	EPA 200.8	MPRP/44988	EPA 200.8	ICPM/19554
10261270001	**LAO-SS-1-032014**	EPA 245.1	MERP/10168	EPA 245.1	MERC/11723
10261270002	**LAO-SS-1-032414**	EPA 245.1	MERP/10168	EPA 245.1	MERC/11723
10261270003	**LAO-SS-2-032414**	EPA 245.1	MERP/10168	EPA 245.1	MERC/11723

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10261270

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burenister

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)								Comments
	LAO-SS-1 -032014	3/25/14	1300		X						2				X			X						-001
	LAO-SS-1 -032414	3/24/14	1350		X						2				X			X						-002
	LAO-SS-2 -032414	3/24/14	1400		X						1				X									-003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kessell						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	3/24/14	1410	[signature] / Pace	3/25/14	930
Shipment Method: FedEx Ship Date: 3/24/14						
Shipment Tracking No: 5979 6579 8084						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (No) | Temp Blank: Yes / No (No) | Cooler Temp on Receipt: 1.9 °F/C | Trip Blank: Yes / No (No) | MS/MSD Sample Submitted: Yes / No (No)

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer

Project #: WO#: 10261270

10261270

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5979657980 84

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.6 **Cooler Temp Corrected (°C):** 1.9 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** -0.7 **Date and Initials of Person Examining Contents:** BD 3/25/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? 3/25/14	☒ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed:_____ Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1438	Temp: 2.6	Corrected Temp: 1.9	
Time: 1444	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: _____ **Date:** 3/25/14.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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April 16, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on April 01, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10261909001	**LAO-SS-1-032714**	Water	03/27/14 14:00	04/01/14 09:42
10261909002	**LAO-SS-1-033114**	Water	03/31/14 11:02	04/01/14 09:42
10261909003	**LAO-SS-2-033114**	Water	03/31/14 12:21	04/01/14 09:42
10261909004	**LAO-SS-A2-033114**	Water	03/31/14 11:14	04/01/14 09:42
10261909005	**LAO-SS-A3-033114**	Water	03/31/14 11:10	04/01/14 09:42
10261909006	**LAO-SS-06G-033114**	Water	03/31/14 10:46	04/01/14 09:42
10261909007	**LAO-SS-06F-033114**	Water	03/31/14 10:53	04/01/14 09:42
10261909008	**LAO-SS-SBC-01-033114**	Water	03/31/14 10:57	04/01/14 09:42

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10261909001	**LAO-SS-1-032714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10261909002	**LAO-SS-1-033114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10261909003	**LAO-SS-2-033114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10261909004	**LAO-SS-A2-033114**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10261909005	**LAO-SS-A3-033114**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10261909006	**LAO-SS-06G-033114**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10261909007	**LAO-SS-06F-033114**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
10261909008	**LAO-SS-SBC-01-033114**	SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 16, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/45204

B: Analyte was detected in the associated method blank.

- BLANK for HBN 292582 [MPRP/452 (Lab ID: 1656864)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45204

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10261909003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1656866)
  - Aluminum
  - Calcium
  - Copper
  - Iron
  - Magnesium
  - Zinc
- MSD (Lab ID: 1656867)
  - Aluminum

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 16, 2014

QC Batch: MPRP/45204

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10261909003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Magnesium
- Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/45204

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1656866)
  - Calcium
  - Copper
  - Zinc
- MSD (Lab ID: 1656867)
  - Calcium
  - Copper
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: April 16, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/10180

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10261909003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1648870)
  - Mercury

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: April 16, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/34908

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10261823003,10261909004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1650459)
  - Alkalinity, Total as CaCO3
- MSD (Lab ID: 1650460)
  - Alkalinity, Total as CaCO3

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: April 16, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: April 16, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/34881

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1648598)
  - Total Suspended Solids

QC Batch: WET/34892

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1649615)
  - Total Suspended Solids

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1649615)
  - Total Suspended Solids

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-1-032714 **Lab ID: 10261909001** Collected: 03/27/14 14:00 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0089J**	mg/L	0.010	0.0012	1	04/15/14 14:17	04/16/14 05:24	7429-90-5	B
Arsenic	**0.0025**	mg/L	0.00050	0.00025	1	04/15/14 14:17	04/16/14 05:24	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000033	1	04/15/14 14:17	04/16/14 05:24	7440-43-9	
Calcium	**111**	mg/L	0.40	0.084	10	04/15/14 14:17	04/16/14 05:30	7440-70-2	
Copper	**0.0084**	mg/L	0.0010	0.00022	1	04/15/14 14:17	04/16/14 05:24	7440-50-8	
Iron	**0.020J**	mg/L	0.050	0.0080	1	04/15/14 14:17	04/16/14 05:24	7439-89-6	
Lead	**0.00019**	mg/L	0.00010	0.000046	1	04/15/14 14:17	04/16/14 05:24	7439-92-1	
Magnesium	**30.4**	mg/L	0.10	0.028	10	04/15/14 14:17	04/16/14 05:30	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/15/14 14:17	04/16/14 05:24	7440-22-4	
Total Hardness by 2340B	**402**	mg/L	0.71	0.36	10	04/15/14 14:17	04/16/14 05:30		
Uranium-238	**0.0058**	mg/L	0.00050	0.00025	1	04/15/14 14:17	04/16/14 05:24	7440-61-1	
Zinc	**0.042**	mg/L	0.0050	0.0025	1	04/15/14 14:17	04/16/14 05:24	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/09/14 09:40	04/09/14 13:10	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-1-033114 **Lab ID: 10261909002** Collected: 03/31/14 11:02 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.049**	mg/L	0.010	0.0012	1	04/15/14 14:17	04/16/14 05:35	7429-90-5	
Arsenic	**0.0027**	mg/L	0.00050	0.00025	1	04/15/14 14:17	04/16/14 05:35	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	04/15/14 14:17	04/16/14 05:35	7440-43-9	
Calcium	**115**	mg/L	0.40	0.084	10	04/15/14 14:17	04/16/14 05:41	7440-70-2	
Copper	**0.011**	mg/L	0.0010	0.00022	1	04/15/14 14:17	04/16/14 05:35	7440-50-8	
Iron	**0.062**	mg/L	0.050	0.0080	1	04/15/14 14:17	04/16/14 05:35	7439-89-6	
Lead	**0.00075**	mg/L	0.00010	0.000046	1	04/15/14 14:17	04/16/14 05:35	7439-92-1	
Magnesium	**30.7**	mg/L	0.10	0.028	10	04/15/14 14:17	04/16/14 05:41	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/15/14 14:17	04/16/14 05:35	7440-22-4	
Total Hardness by 2340B	**414**	mg/L	0.71	0.36	10	04/15/14 14:17	04/16/14 05:41		
Uranium-238	**0.0057**	mg/L	0.00050	0.00025	1	04/15/14 14:17	04/16/14 05:35	7440-61-1	
Zinc	**0.054**	mg/L	0.0050	0.0025	1	04/15/14 14:17	04/16/14 05:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/09/14 09:40	04/09/14 13:13	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-2-033114 **Lab ID: 10261909003** Collected: 03/31/14 12:21 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.60**	mg/L	0.010	0.0012	1	04/15/14 14:17	04/16/14 04:33	7429-90-5	M1
Arsenic	**0.055**	mg/L	0.00050	0.00025	1	04/15/14 14:17	04/16/14 04:33	7440-38-2	
Cadmium	**0.024**	mg/L	0.000080	0.000033	1	04/15/14 14:17	04/16/14 04:33	7440-43-9	
Calcium	**134**	mg/L	2.0	0.42	50	04/15/14 14:17	04/16/14 05:07	7440-70-2	M1
Copper	**1.6**	mg/L	0.0050	0.0011	5	04/15/14 14:17	04/16/14 05:01	7440-50-8	M1
Iron	**10.6**	mg/L	0.050	0.0080	1	04/15/14 14:17	04/16/14 04:33	7439-89-6	M1
Lead	**0.020**	mg/L	0.00010	0.000046	1	04/15/14 14:17	04/16/14 04:33	7439-92-1	
Magnesium	**33.0**	mg/L	0.050	0.014	5	04/15/14 14:17	04/16/14 05:01	7439-95-4	M1
Silver	**0.00034J**	mg/L	0.00050	0.000056	1	04/15/14 14:17	04/16/14 04:33	7440-22-4	
Total Hardness by 2340B	**471**	mg/L	3.6	1.8	50	04/15/14 14:17	04/16/14 05:07		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	04/15/14 14:17	04/16/14 04:33	7440-61-1	
Zinc	**6.3**	mg/L	0.25	0.12	50	04/15/14 14:17	04/16/14 05:07	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000043J**	mg/L	0.00020	0.000026	1	04/09/14 09:40	04/09/14 13:15	7439-97-6	M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-A2-033114 **Lab ID: 10261909004** Collected: 03/31/14 11:14 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**48.1**	mg/L	5.0	2.5	1		04/04/14 11:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**726**	mg/L	10.0	5.0	1		04/03/14 09:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		04/02/14 13:41		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-A3-033114 **Lab ID: 10261909005** Collected: 03/31/14 11:10 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**46.2**	mg/L	5.0	2.5	1		04/04/14 11:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**708**	mg/L	10.0	5.0	1		04/03/14 09:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		04/02/14 13:41		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-06G-033114 **Lab ID: 10261909006** Collected: 03/31/14 10:46 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**83.2**	mg/L	5.0	2.5	1		04/04/14 11:43		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**275**	mg/L	10.0	5.0	1		04/03/14 09:22		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**6.0J**	mg/L	10.0	5.0	1		04/02/14 13:41		D8

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-06F-033114 **Lab ID: 10261909007** Collected: 03/31/14 10:53 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**81.5**	mg/L	5.0	2.5	1		04/04/14 11:46		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**280**	mg/L	10.0	5.0	1		04/03/14 09:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**10.0**	mg/L	10.0	5.0	1		04/03/14 10:41		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Sample: LAO-SS-SBC-01-033114 **Lab ID: 10261909008** Collected: 03/31/14 10:57 Received: 04/01/14 09:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**89.5**	mg/L	5.0	2.5	1		04/04/14 11:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**212**	mg/L	10.0	5.0	1		04/03/14 09:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**9.0J**	mg/L	10.0	5.0	1		04/03/14 10:41		

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

QC Batch: MERP/10180 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10261909001, 10261909002, 10261909003

METHOD BLANK: 1648867 Matrix: Water
Associated Lab Samples: 10261909001, 10261909002, 10261909003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	04/09/14 13:05	

LABORATORY CONTROL SAMPLE: 1648868

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0056	113	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1648869 1648870

Parameter	Units	10261909003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000043J	.005	.005	0.0057	0.0060	113	119	85-115	6	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

QC Batch: MPRP/45204 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10261909001, 10261909002, 10261909003

METHOD BLANK: 1656864 Matrix: Water
Associated Lab Samples: 10261909001, 10261909002, 10261909003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0012J	0.010	04/16/14 04:22	
Arsenic	mg/L	ND	0.00050	04/16/14 04:22	
Cadmium	mg/L	ND	0.000080	04/16/14 04:22	
Calcium	mg/L	ND	0.040	04/16/14 04:22	
Copper	mg/L	ND	0.0010	04/16/14 04:22	
Iron	mg/L	ND	0.050	04/16/14 04:22	
Lead	mg/L	ND	0.00010	04/16/14 04:22	
Magnesium	mg/L	ND	0.010	04/16/14 04:22	
Silver	mg/L	ND	0.00050	04/16/14 04:22	
Uranium-238	mg/L	ND	0.00050	04/16/14 04:22	
Zinc	mg/L	0.0039J	0.0050	04/16/14 04:22	

LABORATORY CONTROL SAMPLE: 1656865

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.086	108	85-115	
Arsenic	mg/L	.08	0.075	94	85-115	
Cadmium	mg/L	.08	0.079	99	85-115	
Calcium	mg/L	1	1.1	106	85-115	
Copper	mg/L	.08	0.079	98	85-115	
Iron	mg/L	1	0.95	95	85-115	
Lead	mg/L	.08	0.075	94	85-115	
Magnesium	mg/L	1	0.94	94	85-115	
Silver	mg/L	.08	0.085	106	85-115	
Uranium-238	mg/L	.08	0.073	91	85-115	
Zinc	mg/L	.08	0.082	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1656866 1656867

Parameter	Units	10261909003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.60	.08	.08	0.75	0.76	192	195	70-130	.3	20	M1
Arsenic	mg/L	0.055	.08	.08	0.13	0.13	97	99	70-130	1	20	
Cadmium	mg/L	0.024	.08	.08	0.10	0.10	101	99	70-130	1	20	
Calcium	mg/L	134	1	1	131	135	-276	122	70-130	3	20	E,M1
Copper	mg/L	1.6	.08	.08	1.6	1.6	41	81	70-130	2	20	E,M1
Iron	mg/L	10.6	1	1	12.0	11.9	134	127	70-130	.6	20	M1
Lead	mg/L	0.020	.08	.08	0.097	0.095	96	95	70-130	1	20	
Magnesium	mg/L	33.0	1	1	32.7	33.5	-36	46	70-130	2	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1656866 1656867

Parameter	Units	10261909003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	0.00034 J	.08	.08	0.085	0.084	105	104	70-130	1	20	
Uranium-238	mg/L	0.015	.08	.08	0.089	0.089	93	93	70-130	.7	20	
Zinc	mg/L	6.3	.08	.08	6.1	6.3	-185	-20	70-130	2	20	E,M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

QC Batch: WET/34908 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10261909004, 10261909005, 10261909006, 10261909007, 10261909008

METHOD BLANK: 1650456 — Matrix: Water
Associated Lab Samples: 10261909004, 10261909005, 10261909006, 10261909007, 10261909008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	04/04/14 09:21	

LABORATORY CONTROL SAMPLE & LCSD: 1650457 1650458

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.3	41.0	103	102	90-110	.6	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1650459 1650460

Parameter	Units	10261823003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	498	40	40	553	551	136	133	80-120	.2	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1650461 1650462

Parameter	Units	10261909004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	48.1	40	40	85.4	81.5	93	84	80-120	5	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

QC Batch: WET/34879 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10261909004, 10261909005, 10261909006, 10261909007, 10261909008

METHOD BLANK: 1648587 Matrix: Water
Associated Lab Samples: 10261909004, 10261909005, 10261909006, 10261909007, 10261909008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	04/03/14 09:18	

LABORATORY CONTROL SAMPLE: 1648588

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	960	96	80-120	

SAMPLE DUPLICATE: 1648589

Parameter	Units	10261761001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	52000	53700	3	10	

SAMPLE DUPLICATE: 1648590

Parameter	Units	10261909008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	212	215	1	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

QC Batch: WET/34881 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10261909004, 10261909005, 10261909006

METHOD BLANK: 1648595 Matrix: Water
Associated Lab Samples: 10261909004, 10261909005, 10261909006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	04/02/14 13:42	

LABORATORY CONTROL SAMPLE: 1648596

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	108	108	80-120	

SAMPLE DUPLICATE: 1648597

Parameter	Units	10261752001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1648598

Parameter	Units	10261909006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	6.0J	9.0J		10	D8

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

QC Batch: WET/34892 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10261909007, 10261909008

METHOD BLANK: 1649613 | Matrix: Water
Associated Lab Samples: 10261909007, 10261909008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	04/03/14 10:40	

LABORATORY CONTROL SAMPLE: 1649614

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	96.0	96	80-120	

SAMPLE DUPLICATE: 1649615

Parameter	Units	10262053001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	80.0	92.0	14	10	D6,D8

SAMPLE DUPLICATE: 1649616

Parameter	Units	10261912002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10261909

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10261909001	**LAO-SS-1-032714**	EPA 200.8	MPRP/45204	EPA 200.8	ICPM/19615
10261909002	**LAO-SS-1-033114**	EPA 200.8	MPRP/45204	EPA 200.8	ICPM/19615
10261909003	**LAO-SS-2-033114**	EPA 200.8	MPRP/45204	EPA 200.8	ICPM/19615
10261909001	**LAO-SS-1-032714**	EPA 245.1	MERP/10180	EPA 245.1	MERC/11761
10261909002	**LAO-SS-1-033114**	EPA 245.1	MERP/10180	EPA 245.1	MERC/11761
10261909003	**LAO-SS-2-033114**	EPA 245.1	MERP/10180	EPA 245.1	MERC/11761
10261909004	**LAO-SS-A2-033114**	SM 2320B	WET/34908		
10261909005	**LAO-SS-A3-033114**	SM 2320B	WET/34908		
10261909006	**LAO-SS-06G-033114**	SM 2320B	WET/34908		
10261909007	**LAO-SS-06F-033114**	SM 2320B	WET/34908		
10261909008	**LAO-SS-SBC-01-033114**	SM 2320B	WET/34908		
10261909004	**LAO-SS-A2-033114**	SM 2540C	WET/34879		
10261909005	**LAO-SS-A3-033114**	SM 2540C	WET/34879		
10261909006	**LAO-SS-06G-033114**	SM 2540C	WET/34879		
10261909007	**LAO-SS-06F-033114**	SM 2540C	WET/34879		
10261909008	**LAO-SS-SBC-01-033114**	SM 2540C	WET/34879		
10261909004	**LAO-SS-A2-033114**	SM 2540D	WET/34881		
10261909005	**LAO-SS-A3-033114**	SM 2540D	WET/34881		
10261909006	**LAO-SS-06G-033114**	SM 2540D	WET/34881		
10261909007	**LAO-SS-06F-033114**	SM 2540D	WET/34892		
10261909008	**LAO-SS-SBC-01-033114**	SM 2540D	WET/34892		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) Lab Work Order Number: 1026 1909

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis. MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ LAUREN BURMEISTER

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	TDS	TSS	Alkalinity				Comments
	LAO-SS-1 -032714	3/27/14	1420		X						2			X			X							1026 1909 001
	LAO-SS-1 - 033114	3/31/14	11:02		X						2			X			X							002
	LAO-SS-2 -033114	3/31/14	12:21		X						1			X										003
	LAO-SS-A2-033114		11:14		X						1							X	X	X				004
	LAO-SS-A3-033114		11:10		X						1							X	X	X				005
	LAO-SS-06G-033114		10:46		X						1							X	X	X				006
	LAO-SS-06F-033114		10:53		X						1							X	X	X				007
	LAO-SS-SBC-01-033114		10:57		X						1							X	X	X				008

Sampler's Name: CJ Kissell, J Hickey

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 3/31/14

Shipment Tracking No: 5540 9200 5794

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / PTS	3/31/14	1500	[signature] / Pace-MN	4/1/14	9:42

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer **Project #:** **WO# : 10261909** 10261909

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 554092005794

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A912167504 ☐ 80512447 ☐ 72337080 ☒ 1491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 **Cooler Temp Corrected (°C):** 3.2 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** -.7 **Date and Initials of Person Examining Contents:** JT 4/1/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☐ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample # 001-003
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 11:34 Temp:	Corrected Temp: 3.2
Time: 11:39 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 4/1/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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April 18, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10262594

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on April 08, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10262594

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10262594

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10262594001	**LAO-SS-1 040314**	Water	04/03/14 08:00	04/08/14 09:27
10262594002	**LAO-SS-1 040714**	Water	04/03/14 11:18	04/08/14 09:27
10262594003	**LAO-SS-2 040714**	Water	04/03/14 12:18	04/08/14 09:27

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10262594

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10262594001	**LAO-SS-1 040314**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10262594002	**LAO-SS-1 040714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10262594003	**LAO-SS-2 040714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10262594

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 18, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45194

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10262594001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1656606)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1656607)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10262594

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 18, 2014

Analyte Comments:

QC Batch: MPRP/45194

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1656606)
  - Calcium
- MSD (Lab ID: 1656607)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10262594

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: April 18, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10262594

Sample: LAO-SS-1 040314 **Lab ID: 10262594001** Collected: 04/03/14 08:00 Received: 04/08/14 09:27 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0092J**	mg/L	0.010	0.0012	1	04/15/14 15:15	04/16/14 08:01	7429-90-5	
Arsenic	**0.0032**	mg/L	0.00050	0.00025	1	04/15/14 15:15	04/16/14 08:01	7440-38-2	
Cadmium	**0.00019**	mg/L	0.000080	0.000033	1	04/15/14 15:15	04/16/14 08:01	7440-43-9	
Calcium	**116**	mg/L	0.80	0.17	20	04/15/14 15:15	04/16/14 08:07	7440-70-2	M1
Copper	**0.0080**	mg/L	0.0010	0.00022	1	04/15/14 15:15	04/16/14 08:01	7440-50-8	
Iron	**0.019J**	mg/L	0.050	0.0080	1	04/15/14 15:15	04/16/14 08:01	7439-89-6	
Lead	**0.00028**	mg/L	0.00010	0.000046	1	04/15/14 15:15	04/16/14 08:01	7439-92-1	
Magnesium	**35.8**	mg/L	0.20	0.057	20	04/15/14 15:15	04/16/14 08:07	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	04/15/14 15:15	04/16/14 08:01	7440-22-4	
Total Hardness by 2340B	**437**	mg/L	1.4	0.71	20	04/15/14 15:15	04/16/14 08:07		
Uranium-238	**0.0062**	mg/L	0.00050	0.00025	1	04/15/14 15:15	04/16/14 08:01	7440-61-1	
Zinc	**0.044**	mg/L	0.0050	0.0025	1	04/15/14 15:15	04/16/14 08:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/16/14 09:05	04/17/14 16:37	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10262594

Sample: LAO-SS-1 040714 **Lab ID: 10262594002** Collected: 04/03/14 11:18 Received: 04/08/14 09:27 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.016**	mg/L	0.010	0.0012	1	04/15/14 15:15	04/16/14 08:31	7429-90-5	
Arsenic	**0.0038**	mg/L	0.00050	0.00025	1	04/15/14 15:15	04/16/14 08:31	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	04/15/14 15:15	04/16/14 08:31	7440-43-9	
Calcium	**113**	mg/L	0.80	0.17	20	04/15/14 15:15	04/16/14 08:34	7440-70-2	
Copper	**0.010**	mg/L	0.0010	0.00022	1	04/15/14 15:15	04/16/14 08:31	7440-50-8	
Iron	**0.040J**	mg/L	0.050	0.0080	1	04/15/14 15:15	04/16/14 08:31	7439-89-6	
Lead	**0.00083**	mg/L	0.00010	0.000046	1	04/15/14 15:15	04/16/14 08:31	7439-92-1	
Magnesium	**36.0**	mg/L	0.20	0.057	20	04/15/14 15:15	04/16/14 08:34	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/15/14 15:15	04/16/14 08:31	7440-22-4	
Total Hardness by 2340B	**430**	mg/L	1.4	0.71	20	04/15/14 15:15	04/16/14 08:34		
Uranium-238	**0.0058**	mg/L	0.00050	0.00025	1	04/15/14 15:15	04/16/14 08:31	7440-61-1	
Zinc	**0.040**	mg/L	0.0050	0.0025	1	04/15/14 15:15	04/16/14 08:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/16/14 09:05	04/17/14 16:39	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10262594

Sample: LAO-SS-2 040714 **Lab ID: 10262594003** Collected: 04/03/14 12:18 Received: 04/08/14 09:27 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.45**	mg/L	0.010	0.0012	1	04/15/14 15:15	04/16/14 08:37	7429-90-5	
Arsenic	**0.051**	mg/L	0.00050	0.00025	1	04/15/14 15:15	04/16/14 08:37	7440-38-2	
Cadmium	**0.023**	mg/L	0.000080	0.000033	1	04/15/14 15:15	04/16/14 08:37	7440-43-9	
Calcium	**135**	mg/L	0.80	0.17	20	04/15/14 15:15	04/16/14 08:40	7440-70-2	
Copper	**1.2**	mg/L	0.020	0.0043	20	04/15/14 15:15	04/16/14 08:40	7440-50-8	
Iron	**9.0**	mg/L	0.050	0.0080	1	04/15/14 15:15	04/16/14 08:37	7439-89-6	
Lead	**0.019**	mg/L	0.00010	0.000046	1	04/15/14 15:15	04/16/14 08:37	7439-92-1	
Magnesium	**40.6**	mg/L	0.20	0.057	20	04/15/14 15:15	04/16/14 08:40	7439-95-4	
Silver	**0.00016J**	mg/L	0.00050	0.000056	1	04/15/14 15:15	04/16/14 08:37	7440-22-4	
Total Hardness by 2340B	**505**	mg/L	1.4	0.71	20	04/15/14 15:15	04/16/14 08:40		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	04/15/14 15:15	04/16/14 08:37	7440-61-1	
Zinc	**5.6**	mg/L	0.10	0.050	20	04/15/14 15:15	04/16/14 08:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000090J**	mg/L	0.00020	0.000026	1	04/16/14 09:05	04/17/14 16:41	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10262594

QC Batch: MERP/10215 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10262594001, 10262594002, 10262594003

METHOD BLANK: 1653498 | Matrix: Water
Associated Lab Samples: 10262594001, 10262594002, 10262594003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	04/17/14 16:32	

LABORATORY CONTROL SAMPLE: 1653499

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1653500 1653501

Parameter	Units	10262594003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000090J	.005	.005	0.0050	0.0049	97	97	70-130	.4	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10262594

QC Batch: MPRP/45194 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10262594001, 10262594002, 10262594003

METHOD BLANK: 1656604 Matrix: Water
Associated Lab Samples: 10262594001, 10262594002, 10262594003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	04/16/14 07:55	
Arsenic	mg/L	ND	0.00050	04/16/14 07:55	
Cadmium	mg/L	ND	0.000080	04/16/14 07:55	
Calcium	mg/L	ND	0.040	04/16/14 07:55	
Copper	mg/L	ND	0.0010	04/16/14 07:55	
Iron	mg/L	ND	0.050	04/16/14 07:55	
Lead	mg/L	ND	0.00010	04/16/14 07:55	
Magnesium	mg/L	ND	0.010	04/16/14 07:55	
Silver	mg/L	ND	0.00050	04/16/14 07:55	
Uranium-238	mg/L	ND	0.00050	04/16/14 07:55	
Zinc	mg/L	ND	0.0050	04/16/14 07:55	

LABORATORY CONTROL SAMPLE: 1656605

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.089	111	85-115	
Arsenic	mg/L	.08	0.084	106	85-115	
Cadmium	mg/L	.08	0.086	108	85-115	
Calcium	mg/L	1	1.1	108	85-115	
Copper	mg/L	.08	0.088	109	85-115	
Iron	mg/L	1	1.1	114	85-115	
Lead	mg/L	.08	0.088	110	85-115	
Magnesium	mg/L	1	1.1	107	85-115	
Silver	mg/L	.08	0.091	114	85-115	
Uranium-238	mg/L	.08	0.086	108	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1656606 1656607

Parameter	Units	10262594001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0092J	.08	.08	0.089	0.089	100	100	70-130	.3	20	
Arsenic	mg/L	0.0032	.08	.08	0.088	0.090	107	108	70-130	2	20	
Cadmium	mg/L	0.00019	.08	.08	0.084	0.086	105	107	70-130	2	20	
Calcium	mg/L	116	1	1	115	118	-101	164	70-130	2	20	E,M1
Copper	mg/L	0.0080	.08	.08	0.089	0.088	101	100	70-130	.4	20	
Iron	mg/L	0.019J	1	1	1.2	1.2	114	116	70-130	2	20	
Lead	mg/L	0.00028	.08	.08	0.084	0.088	105	110	70-130	4	20	
Magnesium	mg/L	35.8	1	1	36.1	37.2	31	145	70-130	3	20	M1
Silver	mg/L	ND	.08	.08	0.083	0.085	104	106	70-130	2	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10262594

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1656606 1656607

Parameter	Units	10262594001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0062	.08	.08	0.087	0.089	100	104	70-130	3	20	
Zinc	mg/L	0.044	.08	.08	0.12	0.12	97	100	70-130	2	20	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10262594

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10262594

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10262594001	**LAO-SS-1 040314**	EPA 200.8	MPRP/45194	EPA 200.8	ICPM/19618
10262594002	**LAO-SS-1 040714**	EPA 200.8	MPRP/45194	EPA 200.8	ICPM/19618
10262594003	**LAO-SS-2 040714**	EPA 200.8	MPRP/45194	EPA 200.8	ICPM/19618
10262594001	**LAO-SS-1 040314**	EPA 245.1	MERP/10215	EPA 245.1	MERC/11791
10262594002	**LAO-SS-1 040714**	EPA 245.1	MERP/10215	EPA 245.1	MERC/11791
10262594003	**LAO-SS-2 040714**	EPA 245.1	MERP/10215	EPA 245.1	MERC/11791

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10262594

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-040314	4/3/14	8:00		X						2				X			X							001
	LAO-SS-1-040714	4/7/14	11:18		X						2				X			X							002
	LAO-SS-2-040714	4/7/14	12:18		X						1				X										003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hobey, C Kissell						
Sampler's Company: Pioneer Technical Services	PTS	4/7/14	1445	Pace	4/8/14	9:27
Shipment Method: Fed Ex Ship Date: 4/7/14						
Shipment Tracking No: 5540 9202 0772						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO#: 10262594

10262594

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9202 0772

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ ~~B88A91216~~7504 1491 JP 4.8.14 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.6 **Cooler Temp Corrected (°C):** 1.9 **Biological Tissue Frozen?** ☐ Yes ☑ No

Temp should be above freezing to 6°C **Correction Factor:** -0.7 **Date and Initials of Person Examining Contents:** JP 4.8.14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8. no ms/msd received
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? JP 4/8/14	☐ Yes	☑ No	☐ N/A	11.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1-2: 2/2 3: 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☑ No	☐ N/A	15. JP 4/8/14
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins JP 4.8.14	
Opened Time: 10:47 Temp: 2.6	Corrected Temp: 1.9
Time: put in cooler	
Time: 10:52 Temp:	Corrected Temp:

Project Manager Review: **Date:** 4/8/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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1700 Elm Street - Suite 200
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April 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on April 15, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10263484001	**LAO-SS-1-041014**	Water	04/10/14 16:30	04/15/14 10:25
10263484002	**LAO-SS-1-041414**	Water	04/14/14 11:55	04/15/14 10:25
10263484003	**LAO-SS-2-041414**	Water	04/14/14 11:10	04/15/14 10:25
10263484004	**LAO-SS-2T-041414**	Water	04/14/14 11:10	04/15/14 10:25
10263484005	**LAO-SS-3-041414**	Water	04/14/14 11:30	04/15/14 10:25
10263484006	**LAO-SS-4-041414**	Water	04/14/14 11:00	04/15/14 10:25

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10263484001	**LAO-SS-1-041014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10263484002	**LAO-SS-1-041414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10263484003	**LAO-SS-2-041414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10263484004	**LAO-SS-2T-041414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10263484005	**LAO-SS-3-041414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	JBB	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10263484006	**LAO-SS-4-041414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	JBB	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 28, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/45218

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1657936)
  - Zinc

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45409

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10263484006

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1664998)
  - Aluminum

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: April 28, 2014

Analyte Comments:

QC Batch: MPRP/45218

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1657938)
  - Calcium
- MSD (Lab ID: 1657939)
  - Calcium

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1657936)
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: April 28, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: April 28, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: April 28, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: WET/35071

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1657538)
  - Total Dissolved Solids

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: WET/35071

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1657538)
  - Total Dissolved Solids

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: April 28, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: April 28, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/17802

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10263484002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1657513)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1657514)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Sample: LAO-SS-1-041014 **Lab ID: 10263484001** Collected: 04/10/14 16:30 Received: 04/15/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.056**	mg/L	0.010	0.0012	1	04/25/14 15:13	04/28/14 09:56	7429-90-5	
Arsenic	**0.0042**	mg/L	0.00050	0.00025	1	04/25/14 15:13	04/28/14 09:56	7440-38-2	
Cadmium	**0.00019**	mg/L	0.000080	0.000033	1	04/25/14 15:13	04/28/14 09:56	7440-43-9	
Calcium	**117**	mg/L	0.40	0.084	10	04/25/14 15:13	04/28/14 10:00	7440-70-2	
Copper	**0.012**	mg/L	0.0010	0.00022	1	04/25/14 15:13	04/28/14 09:56	7440-50-8	
Iron	**0.090**	mg/L	0.050	0.0080	1	04/25/14 15:13	04/28/14 09:56	7439-89-6	
Lead	**0.0013**	mg/L	0.00010	0.000046	1	04/25/14 15:13	04/28/14 09:56	7439-92-1	
Magnesium	**33.7**	mg/L	0.10	0.028	10	04/25/14 15:13	04/28/14 10:00	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/25/14 15:13	04/28/14 09:56	7440-22-4	
Total Hardness by 2340B	**431**	mg/L	0.71	0.36	10	04/25/14 15:13	04/28/14 10:00		
Uranium-238	**0.0056**	mg/L	0.00050	0.00025	1	04/25/14 15:13	04/28/14 09:56	7440-61-1	
Zinc	**0.041**	mg/L	0.0050	0.0025	1	04/25/14 15:13	04/28/14 09:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/18/14 11:52	04/18/14 14:18	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Sample: LAO-SS-1-041414 **Lab ID: 10263484002** Collected: 04/14/14 11:55 Received: 04/15/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.024**	mg/L	0.010	0.0012	1	04/17/14 08:39	04/22/14 17:19	7429-90-5	
Arsenic	**0.0049**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 17:19	7440-38-2	
Cadmium	**0.00019**	mg/L	0.000080	0.000033	1	04/17/14 08:39	04/22/14 17:19	7440-43-9	
Calcium	**111**	mg/L	0.40	0.084	10	04/17/14 08:39	04/22/14 17:23	7440-70-2	
Copper	**0.013**	mg/L	0.0010	0.00022	1	04/17/14 08:39	04/22/14 17:19	7440-50-8	
Iron	**0.049J**	mg/L	0.050	0.0080	1	04/17/14 08:39	04/22/14 17:19	7439-89-6	
Lead	**0.0012**	mg/L	0.00010	0.000046	1	04/17/14 08:39	04/22/14 17:19	7439-92-1	
Magnesium	**32.2**	mg/L	0.10	0.028	10	04/17/14 08:39	04/22/14 17:23	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/17/14 08:39	04/22/14 17:19	7440-22-4	
Total Hardness by 2340B	**409**	mg/L	0.71	0.36	10	04/17/14 08:39	04/22/14 17:23		
Uranium-238	**0.0048**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 17:19	7440-61-1	
Zinc	**0.050**	mg/L	0.0050	0.0025	1	04/17/14 08:39	04/22/14 17:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/18/14 11:52	04/18/14 14:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**36.9**	mg/L	5.0	2.5	1		04/17/14 13:11		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**739**	mg/L	10.0	5.0	1		04/17/14 10:32		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**10.0**	mg/L	10.0	5.0	1		04/16/14 14:36		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.31**	mg/L	0.10	0.050	1		04/16/14 11:44		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Sample: LAO-SS-2-041414 **Lab ID: 10263484003** Collected: 04/14/14 11:10 Received: 04/15/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.13**	mg/L	0.010	0.0012	1	04/17/14 08:39	04/22/14 17:28	7429-90-5	
Arsenic	**0.025**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 17:28	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	04/17/14 08:39	04/22/14 17:28	7440-43-9	
Calcium	**133**	mg/L	0.40	0.084	10	04/17/14 08:39	04/22/14 17:33	7440-70-2	
Copper	**0.69**	mg/L	0.010	0.0022	10	04/17/14 08:39	04/22/14 17:33	7440-50-8	
Iron	**3.7**	mg/L	0.050	0.0080	1	04/17/14 08:39	04/22/14 17:28	7439-89-6	
Lead	**0.011**	mg/L	0.00010	0.000046	1	04/17/14 08:39	04/22/14 17:28	7439-92-1	
Magnesium	**34.2**	mg/L	0.10	0.028	10	04/17/14 08:39	04/22/14 17:33	7439-95-4	
Silver	**0.000066J**	mg/L	0.00050	0.000056	1	04/17/14 08:39	04/22/14 17:28	7440-22-4	
Total Hardness by 2340B	**473**	mg/L	0.71	0.36	10	04/17/14 08:39	04/22/14 17:33		
Uranium-238	**0.014**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 17:28	7440-61-1	
Zinc	**5.2**	mg/L	0.50	0.25	100	04/17/14 08:39	04/22/14 17:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000066J**	mg/L	0.00020	0.000026	1	04/18/14 11:52	04/18/14 14:23	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**109**	mg/L	5.0	2.5	1		04/17/14 13:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**837**	mg/L	10.0	5.0	1		04/17/14 14:12		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**24.0**	mg/L	10.0	5.0	1		04/16/14 14:36		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.77**	mg/L	0.10	0.050	1		04/16/14 11:50		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Sample: LAO-SS-2T-041414 **Lab ID: 10263484004** Collected: 04/14/14 11:10 Received: 04/15/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.14**	mg/L	0.010	0.0012	1	04/17/14 08:39	04/22/14 17:42	7429-90-5	
Arsenic	**0.026**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 17:42	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	04/17/14 08:39	04/22/14 17:42	7440-43-9	
Calcium	**135**	mg/L	0.40	0.084	10	04/17/14 08:39	04/22/14 17:46	7440-70-2	
Copper	**0.72**	mg/L	0.010	0.0022	10	04/17/14 08:39	04/22/14 17:46	7440-50-8	
Iron	**3.8**	mg/L	0.050	0.0080	1	04/17/14 08:39	04/22/14 17:42	7439-89-6	
Lead	**0.011**	mg/L	0.00010	0.000046	1	04/17/14 08:39	04/22/14 17:42	7439-92-1	
Magnesium	**34.8**	mg/L	0.10	0.028	10	04/17/14 08:39	04/22/14 17:46	7439-95-4	
Silver	**0.000067J**	mg/L	0.00050	0.000056	1	04/17/14 08:39	04/22/14 17:42	7440-22-4	
Total Hardness by 2340B	**480**	mg/L	0.71	0.36	10	04/17/14 08:39	04/22/14 17:46		
Uranium-238	**0.014**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 17:42	7440-61-1	
Zinc	**5.2**	mg/L	0.50	0.25	100	04/17/14 08:39	04/22/14 17:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000064J**	mg/L	0.00020	0.000026	1	04/18/14 11:52	04/18/14 14:35	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**108**	mg/L	5.0	2.5	1		04/17/14 13:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**835**	mg/L	10.0	5.0	1		04/17/14 14:12		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**21.0**	mg/L	10.0	5.0	1		04/16/14 14:36		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.83**	mg/L	0.10	0.050	1		04/16/14 11:50		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Sample: LAO-SS-3-041414 **Lab ID: 10263484005** Collected: 04/14/14 11:30 Received: 04/15/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.39**	mg/L	0.010	0.0012	1	04/17/14 08:39	04/22/14 18:07	7429-90-5	
Arsenic	**0.0056**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 18:07	7440-38-2	
Cadmium	**0.034**	mg/L	0.000080	0.000033	1	04/17/14 08:39	04/22/14 18:07	7440-43-9	
Calcium	**135**	mg/L	0.40	0.084	10	04/17/14 08:39	04/22/14 18:11	7440-70-2	
Copper	**2.0**	mg/L	0.010	0.0022	10	04/17/14 08:39	04/22/14 18:11	7440-50-8	
Iron	**11.3**	mg/L	0.050	0.0080	1	04/17/14 08:39	04/22/14 18:07	7439-89-6	
Lead	**0.0024**	mg/L	0.00010	0.000046	1	04/17/14 08:39	04/22/14 18:07	7439-92-1	
Magnesium	**35.0**	mg/L	0.10	0.028	10	04/17/14 08:39	04/22/14 18:11	7439-95-4	
Silver	**0.000087J**	mg/L	0.00050	0.000056	1	04/17/14 08:39	04/22/14 18:07	7440-22-4	
Total Hardness by 2340B	**482**	mg/L	0.71	0.36	10	04/17/14 08:39	04/22/14 18:11		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	04/17/14 08:39	04/22/14 18:07	7440-61-1	
Zinc	**7.4**	mg/L	0.50	0.25	100	04/17/14 08:39	04/22/14 18:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/18/14 11:52	04/18/14 14:38	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**70.3**	mg/L	5.0	2.5	1		04/17/14 12:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**885**	mg/L	10.0	5.0	1		04/17/14 10:33		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**28.0**	mg/L	10.0	5.0	1		04/16/14 13:43		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.6**	mg/L	0.10	0.050	1		04/16/14 11:54		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Sample: LAO-SS-4-041414 **Lab ID: 10263484006** Collected: 04/14/14 11:00 Received: 04/15/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0041J**	mg/L	0.010	0.0012	1	04/25/14 15:13	04/28/14 10:05	7429-90-5	M1
Arsenic	ND	mg/L	0.00050	0.00025	1	04/25/14 15:13	04/28/14 10:05	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	04/25/14 15:13	04/28/14 10:05	7440-43-9	
Calcium	**0.031J**	mg/L	0.040	0.0084	1	04/25/14 15:13	04/28/14 10:05	7440-70-2	
Copper	**0.00030J**	mg/L	0.0010	0.00022	1	04/25/14 15:13	04/28/14 10:05	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	04/25/14 15:13	04/28/14 10:05	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	04/25/14 15:13	04/28/14 10:05	7439-92-1	
Magnesium	**0.0079J**	mg/L	0.010	0.0028	1	04/25/14 15:13	04/28/14 10:05	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/25/14 15:13	04/28/14 10:05	7440-22-4	
Total Hardness by 2340B	**0.11**	mg/L	0.071	0.036	1	04/25/14 15:13	04/28/14 10:05		
Uranium-238	ND	mg/L	0.00050	0.00025	1	04/25/14 15:13	04/28/14 10:05	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	04/25/14 15:13	04/28/14 10:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/18/14 11:52	04/18/14 14:40	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		04/17/14 13:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		04/17/14 10:34		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		04/16/14 13:44		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		04/16/14 11:54		

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: MERP/10247 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10263484001, 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

METHOD BLANK: 1659556 Matrix: Water
Associated Lab Samples: 10263484001, 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	04/18/14 14:13	

LABORATORY CONTROL SAMPLE: 1659557

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1659558 1659559

Parameter	Units	10263484003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000066J	.005	.005	0.0048	0.0052	95	103	70-130	8	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: MPRP/45218 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005

METHOD BLANK: 1657936 Matrix: Water
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0017J	0.010	04/22/14 16:13	
Arsenic	mg/L	ND	0.00050	04/22/14 16:13	
Cadmium	mg/L	ND	0.000080	04/22/14 16:13	
Calcium	mg/L	ND	0.040	04/22/14 16:13	
Copper	mg/L	ND	0.0010	04/22/14 16:13	
Iron	mg/L	ND	0.050	04/22/14 16:13	
Lead	mg/L	ND	0.00010	04/22/14 16:13	
Magnesium	mg/L	ND	0.010	04/22/14 16:13	
Silver	mg/L	ND	0.00050	04/22/14 16:13	
Uranium-238	mg/L	ND	0.00050	04/22/14 16:13	
Zinc	mg/L	0.0044J	0.0050	04/22/14 16:13	P8

LABORATORY CONTROL SAMPLE: 1657937

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	0.96	96	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.080	101	85-115	
Uranium-238	mg/L	.08	0.080	100	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1657938 1657939

Parameter	Units	10264911001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	18.4 ug/L	.08	.08	0.10	0.11	107	109	70-130	1	20	
Arsenic	mg/L	4.1 ug/L	.08	.08	0.087	0.089	104	106	70-130	2	20	
Cadmium	mg/L	0.18 ug/L	.08	.08	0.082	0.084	103	104	70-130	2	20	
Calcium	mg/L	114000 ug/L	1	1	114	115	90	122	70-130	.3	20	E
Copper	mg/L	11.7 ug/L	.08	.08	0.096	0.095	106	105	70-130	.9	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1657938 1657939

Parameter	Units	10264911001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	51.0 ug/L	1	1	1.1	1.0	100	97	70-130	2	20	
Lead	mg/L	0.86 ug/L	.08	.08	0.085	0.085	105	105	70-130	.09	20	
Magnesium	mg/L	32100 ug/L	1	1	33.1	33.1	96	100	70-130	.1	20	
Silver	mg/L	ND	.08	.08	0.080	0.080	100	100	70-130	.07	20	
Uranium-238	mg/L	5.5 ug/L	.08	.08	0.089	0.089	104	104	70-130	.2	20	
Zinc	mg/L	41.0 ug/L	.08	.08	0.13	0.13	106	108	70-130	.9	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: MPRP/45409 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10263484001, 10263484006

METHOD BLANK: 1664889 | Matrix: Water
Associated Lab Samples: 10263484001, 10263484006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	04/28/14 09:51	
Arsenic	mg/L	ND	0.00050	04/28/14 09:51	
Cadmium	mg/L	ND	0.000080	04/28/14 09:51	
Calcium	mg/L	ND	0.040	04/28/14 09:51	
Copper	mg/L	ND	0.0010	04/28/14 09:51	
Iron	mg/L	ND	0.050	04/28/14 09:51	
Lead	mg/L	ND	0.00010	04/28/14 09:51	
Magnesium	mg/L	ND	0.010	04/28/14 09:51	
Silver	mg/L	ND	0.00050	04/28/14 09:51	
Uranium-238	mg/L	ND	0.00050	04/28/14 09:51	
Zinc	mg/L	ND	0.0050	04/28/14 09:51	

LABORATORY CONTROL SAMPLE: 1664890

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.084	105	85-115	
Arsenic	mg/L	.08	0.075	94	85-115	
Cadmium	mg/L	.08	0.078	97	85-115	
Calcium	mg/L	1	0.91	91	85-115	
Copper	mg/L	.08	0.077	97	85-115	
Iron	mg/L	1	0.97	97	85-115	
Lead	mg/L	.08	0.081	101	85-115	
Magnesium	mg/L	1	0.99	99	85-115	
Silver	mg/L	.08	0.077	96	85-115	
Uranium-238	mg/L	.08	0.077	97	85-115	
Zinc	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1664997 1664998

Parameter	Units	10263484006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0041J	.08	.08	0.094	0.11	113	133	70-130	16	20	M1
Arsenic	mg/L	ND	.08	.08	0.080	0.079	100	99	70-130	1	20	
Cadmium	mg/L	ND	.08	.08	0.081	0.080	101	100	70-130	1	20	
Calcium	mg/L	0.031J	1	1	0.95	0.91	92	88	70-130	4	20	
Copper	mg/L	0.00030 J	.08	.08	0.080	0.079	100	98	70-130	2	20	
Iron	mg/L	ND	1	1	1.0	1.0	100	100	70-130	.1	20	
Lead	mg/L	ND	.08	.08	0.084	0.083	105	104	70-130	2	20	
Magnesium	mg/L	0.0079J	1	1	1.0	1.0	102	104	70-130	2	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1664997 1664998

Parameter	Units	10263484006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	ND	.08	.08	0.080	0.079	100	99	70-130	2	20	
Uranium-238	mg/L	ND	.08	.08	0.081	0.079	101	99	70-130	2	20	
Zinc	mg/L	ND	.08	.08	0.084	0.084	103	103	70-130	.5	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: WET/35069 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

METHOD BLANK: 1657519 Matrix: Water
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	04/17/14 10:59	

LABORATORY CONTROL SAMPLE & LCSD: 1657520 1657521

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.8	40.7	102	102	90-110	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1657522 1657523

Parameter	Units	10263410005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	315	40	40	358	363	106	118	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1657524 1657525

Parameter	Units	10263484004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	108	40	40	151	150	109	106	80-120	.9	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: WET/35071 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

METHOD BLANK: 1657538 Matrix: Water
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	10.0	10.0	04/17/14 10:30	P8

LABORATORY CONTROL SAMPLE: 1657539

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	998	100	80-120	

SAMPLE DUPLICATE: 1657540

Parameter	Units	10263003001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	468	462	1	10	

SAMPLE DUPLICATE: 1657541

Parameter	Units	10263436010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	425	434	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: WET/35075 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10263484002, 10263484003, 10263484004

METHOD BLANK: 1657687 | Matrix: Water
Associated Lab Samples: 10263484002, 10263484003, 10263484004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	04/16/14 14:34	

LABORATORY CONTROL SAMPLE: 1657688

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	96.0	96	80-120	

SAMPLE DUPLICATE: 1657689

Parameter	Units	10263436001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1657690

Parameter	Units	10263484004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	21.0	20.0	5	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: WET/35077 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10263484005, 10263484006

METHOD BLANK: 1657733 | Matrix: Water
Associated Lab Samples: 10263484005, 10263484006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	04/16/14 13:43	

LABORATORY CONTROL SAMPLE: 1657734

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	107	107	80-120	

SAMPLE DUPLICATE: 1657735

Parameter	Units	10263484005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	28.0	30.0	7	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

QC Batch: WETA/17802 Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

METHOD BLANK: 1657511 Matrix: Water
Associated Lab Samples: 10263484002, 10263484003, 10263484004, 10263484005, 10263484006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	04/16/14 11:39	

LABORATORY CONTROL SAMPLE: 1657512

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1657513 1657514

Parameter	Units	10263484002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.31	2.5	2.5	0.74	0.81	17	20	80-120	9	30	M1

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QUALIFIERS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10263484

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10263484001	**LAO-SS-1-041014**	EPA 200.8	MPRP/45409	EPA 200.8	ICPM/19738
10263484002	**LAO-SS-1-041414**	EPA 200.8	MPRP/45218	EPA 200.8	ICPM/19645
10263484003	**LAO-SS-2-041414**	EPA 200.8	MPRP/45218	EPA 200.8	ICPM/19645
10263484004	**LAO-SS-2T-041414**	EPA 200.8	MPRP/45218	EPA 200.8	ICPM/19645
10263484005	**LAO-SS-3-041414**	EPA 200.8	MPRP/45218	EPA 200.8	ICPM/19645
10263484006	**LAO-SS-4-041414**	EPA 200.8	MPRP/45409	EPA 200.8	ICPM/19738
10263484001	**LAO-SS-1-041014**	EPA 245.1	MERP/10247	EPA 245.1	MERC/11814
10263484002	**LAO-SS-1-041414**	EPA 245.1	MERP/10247	EPA 245.1	MERC/11814
10263484003	**LAO-SS-2-041414**	EPA 245.1	MERP/10247	EPA 245.1	MERC/11814
10263484004	**LAO-SS-2T-041414**	EPA 245.1	MERP/10247	EPA 245.1	MERC/11814
10263484005	**LAO-SS-3-041414**	EPA 245.1	MERP/10247	EPA 245.1	MERC/11814
10263484006	**LAO-SS-4-041414**	EPA 245.1	MERP/10247	EPA 245.1	MERC/11814
10263484002	**LAO-SS-1-041414**	SM 2320B	WET/35069		
10263484003	**LAO-SS-2-041414**	SM 2320B	WET/35069		
10263484004	**LAO-SS-2T-041414**	SM 2320B	WET/35069		
10263484005	**LAO-SS-3-041414**	SM 2320B	WET/35069		
10263484006	**LAO-SS-4-041414**	SM 2320B	WET/35069		
10263484002	**LAO-SS-1-041414**	SM 2540C	WET/35071		
10263484003	**LAO-SS-2-041414**	SM 2540C	WET/35071		
10263484004	**LAO-SS-2T-041414**	SM 2540C	WET/35071		
10263484005	**LAO-SS-3-041414**	SM 2540C	WET/35071		
10263484006	**LAO-SS-4-041414**	SM 2540C	WET/35071		
10263484002	**LAO-SS-1-041414**	SM 2540D	WET/35075		
10263484003	**LAO-SS-2-041414**	SM 2540D	WET/35075		
10263484004	**LAO-SS-2T-041414**	SM 2540D	WET/35075		
10263484005	**LAO-SS-3-041414**	SM 2540D	WET/35077		
10263484006	**LAO-SS-4-041414**	SM 2540D	WET/35077		
10263484002	**LAO-SS-1-041414**	SM 4500-NO3 H	WETA/17802		
10263484003	**LAO-SS-2-041414**	SM 4500-NO3 H	WETA/17802		
10263484004	**LAO-SS-2T-041414**	SM 4500-NO3 H	WETA/17802		
10263484005	**LAO-SS-3-041414**	SM 4500-NO3 H	WETA/17802		
10263484006	**LAO-SS-4-041414**	SM 4500-NO3 H	WETA/17802		

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Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** ____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (~~Weekly~~) Monthly **Lab Work Order Number:** 10263484 ~~001~~ 41514 15

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	TDS, TSS, Alkalinity	NO2 / NO3					Comments
	LAO-SS-1 - 041014	4/10/14	1630		X			2			2				X			X							Comp. 10263484001
	LAO-SS-1 - 041414	4/14/14	1155		X			4	1	1	2				X			X	X	X					Comp 002
	LAO-SS-2 - 041414	4/14/14	1110		X			3	1	1	1				X										Comp 003
	LAO-SS-2T-041414	4/14/14	1110		X			3	1	1	1				X				X	X					Comp 004
	LAO-SS-3-041414	4/14/14	1130		X			3	1	1	1				X				X	X					Grab 005
	LAO-SS-4-041414	4/14/14	1100		X			3	1	1	1				X				X	X					Grab 006

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ Renz	DJ Renz / PTS / [signature]	4/14	1300	[signature]	4/15/14	1025
Sampler's Company: Pioneer Technical Services						
Shipment Method: Fedex Ship Date: 4/14/14						
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer tech

Project #: WO#: 10263484

10263484

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 5540 9202 0680

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☒ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.0 **Cooler Temp Corrected (°C):** 0.6 **Biological Tissue Frozen?** ☐ Yes ☒ No

Temp should be above freezing to 6°C **Correction Factor:** +0.6 **Date and Initials of Person Examining Contents:** JEC 4/15/14

Comments:

				Comments
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☒ N/A	8. 4/16/14
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? 4/16/14	☒ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 2/2 ☒ H_2SO_4 1/1 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # SS1, SS1, SS2, 2T, 3, 4
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1759	Temp: 0.0	Corrected Temp: 0.6
Time: 1805	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 4/16/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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May 06, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on April 22, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10264241001	**LAO-SS-1-041714**	Water	04/17/14 14:00	04/22/14 09:15
10264241002	**LAO-SS-1-042114**	Water	04/21/14 10:08	04/22/14 09:15
10264241003	**LAO-SS-2-042114**	Water	04/21/14 10:57	04/22/14 09:15

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10264241001	**LAO-SS-1-041714**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10264241002	**LAO-SS-1-042114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10264241003	**LAO-SS-2-042114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 06, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45362

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10264444001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1663300)
  - Aluminum
  - Calcium
- MSD (Lab ID: 1663301)
  - Aluminum
  - Calcium

R1: RPD value was outside control limits.

- MSD (Lab ID: 1663301)
  - Aluminum

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: May 06, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Sample: LAO-SS-1-041714 **Lab ID: 10264241001** Collected: 04/17/14 14:00 Received: 04/22/14 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0075J**	mg/L	0.010	0.0012	1	04/24/14 10:18	04/24/14 20:23	7429-90-5	
Arsenic	**0.0040**	mg/L	0.00050	0.00025	1	04/24/14 10:18	04/24/14 20:23	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	04/24/14 10:18	04/24/14 20:23	7440-43-9	
Calcium	**114**	mg/L	0.40	0.084	10	04/24/14 10:18	04/26/14 00:34	7440-70-2	
Copper	**0.0066**	mg/L	0.0010	0.00022	1	04/24/14 10:18	04/24/14 20:23	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0080	1	04/24/14 10:18	04/24/14 20:23	7439-89-6	
Lead	**0.00030**	mg/L	0.00010	0.000046	1	04/24/14 10:18	04/24/14 20:23	7439-92-1	
Magnesium	**31.0**	mg/L	0.10	0.028	10	04/24/14 10:18	04/26/14 00:34	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/24/14 10:18	04/24/14 20:23	7440-22-4	
Total Hardness by 2340B	**412**	mg/L	0.71	0.36	10	04/24/14 10:18	04/26/14 00:34		
Uranium-238	**0.0047**	mg/L	0.00050	0.00025	1	04/24/14 10:18	04/24/14 20:23	7440-61-1	
Zinc	**0.026**	mg/L	0.0050	0.0025	1	04/24/14 10:18	04/24/14 20:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/25/14 10:38	04/25/14 14:23	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Sample: LAO-SS-1-042114 **Lab ID: 10264241002** Collected: 04/21/14 10:08 Received: 04/22/14 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.024**	mg/L	0.010	0.0012	1	04/24/14 10:18	04/24/14 20:43	7429-90-5	
Arsenic	**0.0045**	mg/L	0.00050	0.00025	1	04/24/14 10:18	04/24/14 20:43	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000033	1	04/24/14 10:18	04/24/14 20:43	7440-43-9	
Calcium	**113**	mg/L	0.40	0.084	10	04/24/14 10:18	04/26/14 00:40	7440-70-2	
Copper	**0.0098**	mg/L	0.0010	0.00022	1	04/24/14 10:18	04/24/14 20:43	7440-50-8	
Iron	**0.044J**	mg/L	0.050	0.0080	1	04/24/14 10:18	04/24/14 20:43	7439-89-6	
Lead	**0.00077**	mg/L	0.00010	0.000046	1	04/24/14 10:18	04/24/14 20:43	7439-92-1	
Magnesium	**30.5**	mg/L	0.10	0.028	10	04/24/14 10:18	04/26/14 00:40	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/24/14 10:18	04/24/14 20:43	7440-22-4	
Total Hardness by 2340B	**408**	mg/L	0.71	0.36	10	04/24/14 10:18	04/26/14 00:40		
Uranium-238	**0.0046**	mg/L	0.00050	0.00025	1	04/24/14 10:18	04/24/14 20:43	7440-61-1	
Zinc	**0.035**	mg/L	0.0050	0.0025	1	04/24/14 10:18	04/24/14 20:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	04/25/14 10:38	04/25/14 14:25	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Sample: LAO-SS-2-042114 **Lab ID: 10264241003** Collected: 04/21/14 10:57 Received: 04/22/14 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.13**	mg/L	0.010	0.0012	1	04/24/14 10:18	04/24/14 20:52	7429-90-5	
Arsenic	**0.023**	mg/L	0.00050	0.00025	1	04/24/14 10:18	04/24/14 20:52	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000033	1	04/24/14 10:18	04/24/14 20:52	7440-43-9	
Calcium	**127**	mg/L	0.40	0.084	10	04/24/14 10:18	04/26/14 00:45	7440-70-2	
Copper	**0.61**	mg/L	0.010	0.0022	10	04/24/14 10:18	04/26/14 00:45	7440-50-8	
Iron	**3.5**	mg/L	0.050	0.0080	1	04/24/14 10:18	04/24/14 20:52	7439-89-6	
Lead	**0.0086**	mg/L	0.00010	0.000046	1	04/24/14 10:18	04/24/14 20:52	7439-92-1	
Magnesium	**31.7**	mg/L	0.10	0.028	10	04/24/14 10:18	04/26/14 00:45	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	04/24/14 10:18	04/24/14 20:52	7440-22-4	
Total Hardness by 2340B	**447**	mg/L	0.71	0.36	10	04/24/14 10:18	04/26/14 00:45		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	04/24/14 10:18	04/24/14 20:52	7440-61-1	
Zinc	**5.3**	mg/L	0.50	0.25	100	04/24/14 10:18	04/24/14 21:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000030J**	mg/L	0.00020	0.000026	1	04/25/14 10:38	04/25/14 14:27	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

QC Batch: MERP/10287 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10264241001, 10264241002, 10264241003

METHOD BLANK: 1663626 Matrix: Water
Associated Lab Samples: 10264241001, 10264241002, 10264241003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	04/25/14 14:19	

LABORATORY CONTROL SAMPLE: 1663627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1663628 1663629

Parameter	Units	10264241003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000030J	.005	.005	0.0050	0.0052	100	104	70-130	4	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

QC Batch: MPRP/45362 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10264241001, 10264241002, 10264241003

METHOD BLANK: 1663298 Matrix: Water
Associated Lab Samples: 10264241001, 10264241002, 10264241003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	04/24/14 19:37	
Arsenic	mg/L	ND	0.00050	04/24/14 19:37	
Cadmium	mg/L	ND	0.000080	04/24/14 19:37	
Calcium	mg/L	ND	0.040	04/26/14 00:05	
Copper	mg/L	ND	0.0010	04/24/14 19:37	
Iron	mg/L	ND	0.050	04/24/14 19:37	
Lead	mg/L	ND	0.00010	04/24/14 19:37	
Magnesium	mg/L	ND	0.010	04/24/14 19:37	
Silver	mg/L	ND	0.00050	04/24/14 19:37	
Uranium-238	mg/L	ND	0.00050	04/24/14 19:37	
Zinc	mg/L	ND	0.0050	04/26/14 00:05	

LABORATORY CONTROL SAMPLE: 1663299

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.079	98	85-115	
Cadmium	mg/L	.08	0.080	101	85-115	
Calcium	mg/L	1	0.95	95	85-115	
Copper	mg/L	.08	0.082	102	85-115	
Iron	mg/L	1	1.0	100	85-115	
Lead	mg/L	.08	0.081	102	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.078	98	85-115	
Uranium-238	mg/L	.08	0.079	99	85-115	
Zinc	mg/L	.08	0.086	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1663300 1663301

Parameter	Units	10264444001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	670 ug/L	.08	.08	1.2	0.94	704	334	70-130	27	20	M1,R1
Arsenic	mg/L	1.9 ug/L	.08	.08	0.081	0.081	99	98	70-130	.9	20	
Cadmium	mg/L	0.66 ug/L	.08	.08	0.080	0.081	99	100	70-130	1	20	
Calcium	mg/L	64200 ug/L	1	1	65.8	64.4	155	19	70-130	2	20	M1
Copper	mg/L	10.6 ug/L	.08	.08	0.091	0.091	100	100	70-130	.5	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1663300 1663301

Parameter	Units	10264444001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	925 ug/L	1	1	2.2	2.0	130	105	70-130	12	20	
Lead	mg/L	1.3 ug/L	.08	.08	0.082	0.082	101	101	70-130	.7	20	
Magnesium	mg/L	11900 ug/L	1	1	13.1	12.9	123	106	70-130	1	20	
Silver	mg/L	ND	.08	.08	0.077	0.077	96	97	70-130	.05	20	
Uranium-238	mg/L	1.1 ug/L	.08	.08	0.079	0.080	98	98	70-130	.2	20	
Zinc	mg/L	302 ug/L	.08	.08	0.40	0.39	116	107	70-130	2	20	

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10264241

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10264241001	**LAO-SS-1-041714**	EPA 200.8	MPRP/45362	EPA 200.8	ICPM/19718
10264241002	**LAO-SS-1-042114**	EPA 200.8	MPRP/45362	EPA 200.8	ICPM/19718
10264241003	**LAO-SS-2-042114**	EPA 200.8	MPRP/45362	EPA 200.8	ICPM/19718
10264241001	**LAO-SS-1-041714**	EPA 245.1	MERP/10287	EPA 245.1	MERC/11854
10264241002	**LAO-SS-1-042114**	EPA 245.1	MERP/10287	EPA 245.1	MERC/11854
10264241003	**LAO-SS-2-042114**	EPA 245.1	MERP/10287	EPA 245.1	MERC/11854

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1127

Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10204241

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 -041714	4/17/14	14:00		X						2			X			X	10204241 001
	LAO-SS-1 -042114	4/21/14	10:08		X						2			X			X	002
	LAO-SS-2 -042114	4/21/14	10:57		X						1			X				003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: TMchey, CKissell						
Sampler's Company: Pioneer Technical Services	PTS	4/21/14	1430	Pace	4-22-14	9.15
Shipment Method: FedEx Ship Date: 4/21/14						
Shipment Tracking No: 554092020670						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.7 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO#: 10264241

10264241

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9202 0670

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.0 **Cooler Temp Corrected (°C):** 3.7 **Biological Tissue Frozen?** ☐ Yes ☑ No

Temp should be above freezing to 6°C **Correction Factor:** -0.3 **Date and Initials of Person Examining Contents:** JP 4.22.14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8. no ms/msd received
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1-2: 2/2 3: 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 13:21	Temp: 4.0	Corrected Temp: 3.7
Time:	put in cooler	
Time: 13:24	Temp:	Corrected Temp:

Project Manager Review: **Date:** 4/23/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

May 13, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory between April 29, 2014 and April 30, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10265237001	**LAO-SS-1-042414**	Water	04/24/14 15:15	04/29/14 08:50
10265237002	**LAO-SS-1-042814**	Water	04/28/14 14:00	04/30/14 08:17
10265237003	**LAO-SS-2-042814**	Water	04/28/14 13:50	04/30/14 08:17

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10265237001	**LAO-SS-1-042414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10265237002	**LAO-SS-1-042814**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10265237003	**LAO-SS-2-042814**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 13, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/45631

B: Analyte was detected in the associated method blank.

- BLANK for HBN 295263 [MPRP/456 (Lab ID: 1671602)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45631

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10265237001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1671604)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1671605)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 13, 2014

Analyte Comments:

QC Batch: MPRP/45631

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1671604)
  - Calcium
- MSD (Lab ID: 1671605)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: May 13, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Sample: LAO-SS-1-042414 **Lab ID: 10265237001** Collected: 04/24/14 15:15 Received: 04/29/14 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0083J**	mg/L	0.010	0.0012	1	05/06/14 11:10	05/06/14 17:30	7429-90-5	B
Arsenic	**0.0046**	mg/L	0.00050	0.00025	1	05/06/14 11:10	05/06/14 17:30	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	05/06/14 11:10	05/06/14 17:30	7440-43-9	
Calcium	**116**	mg/L	0.80	0.17	20	05/06/14 11:10	05/06/14 17:36	7440-70-2	M1
Copper	**0.0076**	mg/L	0.0010	0.00022	1	05/06/14 11:10	05/06/14 17:30	7440-50-8	
Iron	**0.019J**	mg/L	0.050	0.0080	1	05/06/14 11:10	05/06/14 17:30	7439-89-6	
Lead	**0.00035**	mg/L	0.00010	0.000046	1	05/06/14 11:10	05/06/14 17:30	7439-92-1	
Magnesium	**32.5**	mg/L	0.20	0.057	20	05/06/14 11:10	05/06/14 17:36	7439-95-4	M1
Silver	**0.000061J**	mg/L	0.00050	0.000056	1	05/06/14 11:10	05/06/14 17:30	7440-22-4	
Total Hardness by 2340B	**424**	mg/L	1.4	0.71	20	05/06/14 11:10	05/06/14 17:36		
Uranium-238	**0.0046**	mg/L	0.00050	0.00025	1	05/06/14 11:10	05/06/14 17:30	7440-61-1	
Zinc	**0.025**	mg/L	0.0050	0.0025	1	05/06/14 11:10	05/06/14 17:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/08/14 08:09	05/08/14 11:33	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Sample: LAO-SS-1-042814 **Lab ID: 10265237002** Collected: 04/28/14 14:00 Received: 04/30/14 08:17 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0072J**	mg/L	0.010	0.0012	1	05/06/14 11:10	05/06/14 18:00	7429-90-5	B
Arsenic	**0.0043**	mg/L	0.00050	0.00025	1	05/06/14 11:10	05/06/14 18:00	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	05/06/14 11:10	05/06/14 18:00	7440-43-9	
Calcium	**113**	mg/L	0.80	0.17	20	05/06/14 11:10	05/06/14 18:03	7440-70-2	
Copper	**0.0075**	mg/L	0.0010	0.00022	1	05/06/14 11:10	05/06/14 18:00	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0080	1	05/06/14 11:10	05/06/14 18:00	7439-89-6	
Lead	**0.00037**	mg/L	0.00010	0.000046	1	05/06/14 11:10	05/06/14 18:00	7439-92-1	
Magnesium	**31.5**	mg/L	0.20	0.057	20	05/06/14 11:10	05/06/14 18:03	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/06/14 11:10	05/06/14 18:00	7440-22-4	
Total Hardness by 2340B	**412**	mg/L	1.4	0.71	20	05/06/14 11:10	05/06/14 18:03		
Uranium-238	**0.0045**	mg/L	0.00050	0.00025	1	05/06/14 11:10	05/06/14 18:00	7440-61-1	
Zinc	**0.028**	mg/L	0.0050	0.0025	1	05/06/14 11:10	05/06/14 18:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/08/14 08:09	05/08/14 11:35	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Sample: LAO-SS-2-042814 **Lab ID: 10265237003** Collected: 04/28/14 13:50 Received: 04/30/14 08:17 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.078**	mg/L	0.010	0.0012	1	05/06/14 11:10	05/06/14 18:06	7429-90-5	
Arsenic	**0.018**	mg/L	0.00050	0.00025	1	05/06/14 11:10	05/06/14 18:06	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	05/06/14 11:10	05/06/14 18:06	7440-43-9	
Calcium	**135**	mg/L	0.80	0.17	20	05/06/14 11:10	05/06/14 18:09	7440-70-2	
Copper	**0.47**	mg/L	0.020	0.0043	20	05/06/14 11:10	05/06/14 18:09	7440-50-8	
Iron	**2.5**	mg/L	0.050	0.0080	1	05/06/14 11:10	05/06/14 18:06	7439-89-6	
Lead	**0.0039**	mg/L	0.00010	0.000046	1	05/06/14 11:10	05/06/14 18:06	7439-92-1	
Magnesium	**34.0**	mg/L	0.20	0.057	20	05/06/14 11:10	05/06/14 18:09	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/06/14 11:10	05/06/14 18:06	7440-22-4	
Total Hardness by 2340B	**477**	mg/L	1.4	0.71	20	05/06/14 11:10	05/06/14 18:09		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	05/06/14 11:10	05/06/14 18:06	7440-61-1	
Zinc	**5.3**	mg/L	0.10	0.050	20	05/06/14 11:10	05/06/14 18:09	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/08/14 08:09	05/08/14 11:38	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

QC Batch: MERP/10358 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10265237001, 10265237002, 10265237003

METHOD BLANK: 1671743 Matrix: Water
Associated Lab Samples: 10265237001, 10265237002, 10265237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	05/08/14 11:28	

LABORATORY CONTROL SAMPLE: 1671744

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671745 1671746

Parameter	Units	10265237003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0056	0.0061	111	122	70-130	9	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

QC Batch: MPRP/45631 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10265237001, 10265237002, 10265237003

METHOD BLANK: 1671602 Matrix: Water
Associated Lab Samples: 10265237001, 10265237002, 10265237003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0012J	0.010	05/06/14 17:24	
Arsenic	mg/L	ND	0.00050	05/06/14 17:24	
Cadmium	mg/L	ND	0.000080	05/06/14 17:24	
Calcium	mg/L	0.012J	0.040	05/06/14 17:24	
Copper	mg/L	ND	0.0010	05/06/14 17:24	
Iron	mg/L	ND	0.050	05/06/14 17:24	
Lead	mg/L	ND	0.00010	05/06/14 17:24	
Magnesium	mg/L	0.0033J	0.010	05/06/14 17:24	
Silver	mg/L	ND	0.00050	05/06/14 17:24	
Uranium-238	mg/L	ND	0.00050	05/06/14 17:24	
Zinc	mg/L	ND	0.0050	05/06/14 17:24	

LABORATORY CONTROL SAMPLE: 1671603

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.086	107	85-115	
Arsenic	mg/L	.08	0.083	103	85-115	
Cadmium	mg/L	.08	0.089	111	85-115	
Calcium	mg/L	1	1.0	100	85-115	
Copper	mg/L	.08	0.085	107	85-115	
Iron	mg/L	1	1.1	110	85-115	
Lead	mg/L	.08	0.087	109	85-115	
Magnesium	mg/L	1	1.1	107	85-115	
Silver	mg/L	.08	0.082	103	85-115	
Uranium-238	mg/L	.08	0.084	105	85-115	
Zinc	mg/L	.08	0.088	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671604 1671605

Parameter	Units	10265237001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0083J	.08	.08	0.098	0.098	112	112	70-130	.6	20	
Arsenic	mg/L	0.0046	.08	.08	0.088	0.088	104	105	70-130	.3	20	
Cadmium	mg/L	0.00015	.08	.08	0.086	0.087	107	108	70-130	1	20	
Calcium	mg/L	116	1	1	118	116	138	30	70-130	.9	20	E,M1
Copper	mg/L	0.0076	.08	.08	0.091	0.091	104	104	70-130	.03	20	
Iron	mg/L	0.019J	1	1	1.1	1.1	107	107	70-130	.005	20	
Lead	mg/L	0.00035	.08	.08	0.084	0.083	104	104	70-130	.2	20	
Magnesium	mg/L	32.5	1	1	34.5	34.9	200	241	70-130	1	20	M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671604 1671605

Parameter	Units	10265237001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	0.000061J	.08	.08	0.078	0.078	97	98	70-130	.5	20	
Uranium-238	mg/L	0.0046	.08	.08	0.085	0.084	100	100	70-130	.8	20	
Zinc	mg/L	0.025	.08	.08	0.11	0.11	105	106	70-130	.6	20	

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10265237

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10265237001	**LAO-SS-1-042414**	EPA 200.8	MPRP/45631	EPA 200.8	ICPM/19853
10265237002	**LAO-SS-1-042814**	EPA 200.8	MPRP/45631	EPA 200.8	ICPM/19853
10265237003	**LAO-SS-2-042814**	EPA 200.8	MPRP/45631	EPA 200.8	ICPM/19853
10265237001	**LAO-SS-1-042414**	EPA 245.1	MERP/10358	EPA 245.1	MERC/11954
10265237002	**LAO-SS-1-042814**	EPA 245.1	MERP/10358	EPA 245.1	MERC/11954
10265237003	**LAO-SS-2-042814**	EPA 245.1	MERP/10358	EPA 245.1	MERC/11954

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1128

Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** ____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10265237

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 - 042414	4/24/14	1515		X						2				X	X	CC1
	LAO-SS-1 - 042914	4/28/14	1400		X						2				X	X	CC2
	LAO-SS-2 - 042814	4/28/14	1350		X						1				X		CC3

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kessell						
Sampler's Company: Pioneer Technical Services	[signature] PTS			[signature] Pace	4-29-14	8:50
Shipment Method: FED EX Ship Date:						
Shipment Tracking No: 5540 9202 0691						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.4 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-210-rev.09	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO#: 10265237

10265237

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5540 9202 0691

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other:

Temp Blank? ☑ Yes ☑ No JP 4.29.14

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.2 **Cooler Temp Corrected (°C):** 2.4 **Biological Tissue Frozen?** ☐ Yes ☑ No

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** JP 4.29.14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8. no ms/msd received
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12) Per method, VOA pH is checked after analysis	☑ Yes ☑ Yes	☐ No ☐ No	☐ N/A ☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample # 1-2: 2/2 3: 1/1 Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 10:47	Temp: 2.2	Corrected Temp: 2.4
Time: 10:54	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 4/30/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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May 20, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on May 06, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10266033001	**LAO-SS-1-050114**	Water	05/01/14 15:20	05/06/14 09:03
10266033002	**LAO-SS-1-050514**	Water	05/05/14 11:06	05/06/14 09:03
10266033003	**LAO-SS-2-050514**	Water	05/05/14 11:57	05/06/14 09:03

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10266033001	**LAO-SS-1-050114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10266033002	**LAO-SS-1-050514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10266033003	**LAO-SS-2-050514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 20, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45782

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10266033001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1676056)
  - Calcium
- MSD (Lab ID: 1676057)
  - Calcium
  - Magnesium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/45782

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1676056)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 20, 2014

Analyte Comments:

QC Batch: MPRP/45782

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1676057)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: May 20, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Sample: LAO-SS-1-050114 **Lab ID: 10266033001** Collected: 05/01/14 15:20 Received: 05/06/14 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.010	0.0012	1	05/13/14 11:46	05/15/14 17:43	7429-90-5	
Arsenic	**0.0038**	mg/L	0.00050	0.00025	1	05/13/14 11:46	05/15/14 17:43	7440-38-2	
Cadmium	**0.000081**	mg/L	0.000080	0.000033	1	05/13/14 11:46	05/15/14 17:43	7440-43-9	
Calcium	**86.8**	mg/L	0.20	0.042	5	05/13/14 11:46	05/15/14 18:10	7440-70-2	M1
Copper	**0.0042**	mg/L	0.0010	0.00022	1	05/13/14 11:46	05/15/14 17:43	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	05/13/14 11:46	05/15/14 17:43	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	05/13/14 11:46	05/15/14 17:43	7439-92-1	
Magnesium	**28.6**	mg/L	0.050	0.014	5	05/13/14 11:46	05/15/14 18:10	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	05/13/14 11:46	05/15/14 17:43	7440-22-4	
Total Hardness by 2340B	**334**	mg/L	0.36	0.18	5	05/13/14 11:46	05/15/14 18:10		
Uranium-238	**0.0042**	mg/L	0.00050	0.00025	1	05/13/14 11:46	05/15/14 17:43	7440-61-1	
Zinc	**0.0091**	mg/L	0.0050	0.0025	1	05/13/14 11:46	05/15/14 17:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/13/14 17:54	05/14/14 14:15	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Sample: LAO-SS-1-050514 **Lab ID: 10266033002** Collected: 05/05/14 11:06 Received: 05/06/14 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.026**	mg/L	0.010	0.0012	1	05/13/14 11:46	05/15/14 18:33	7429-90-5	
Arsenic	**0.0041**	mg/L	0.00050	0.00025	1	05/13/14 11:46	05/15/14 18:33	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	05/13/14 11:46	05/15/14 18:33	7440-43-9	
Calcium	**160**	mg/L	0.40	0.084	10	05/13/14 11:46	05/15/14 18:38	7440-70-2	
Copper	**0.013**	mg/L	0.0010	0.00022	1	05/13/14 11:46	05/15/14 18:33	7440-50-8	
Iron	**0.051**	mg/L	0.050	0.0080	1	05/13/14 11:46	05/15/14 18:33	7439-89-6	
Lead	**0.0010**	mg/L	0.00010	0.000046	1	05/13/14 11:46	05/15/14 18:33	7439-92-1	
Magnesium	**52.3**	mg/L	0.10	0.028	10	05/13/14 11:46	05/15/14 18:38	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/13/14 11:46	05/15/14 18:33	7440-22-4	
Total Hardness by 2340B	**614**	mg/L	0.71	0.36	10	05/13/14 11:46	05/15/14 18:38		
Uranium-238	**0.0038**	mg/L	0.00050	0.00025	1	05/13/14 11:46	05/15/14 18:33	7440-61-1	
Zinc	**0.040**	mg/L	0.0050	0.0025	1	05/13/14 11:46	05/15/14 18:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/13/14 17:54	05/14/14 14:17	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Sample: LAO-SS-2-050514 **Lab ID: 10266033003** Collected: 05/05/14 11:57 Received: 05/06/14 09:03 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.28**	mg/L	0.010	0.0012	1	05/13/14 11:46	05/15/14 18:42	7429-90-5	
Arsenic	**0.048**	mg/L	0.00050	0.00025	1	05/13/14 11:46	05/15/14 18:42	7440-38-2	
Cadmium	**0.021**	mg/L	0.000080	0.000033	1	05/13/14 11:46	05/15/14 18:42	7440-43-9	
Calcium	**206**	mg/L	0.40	0.084	10	05/13/14 11:46	05/15/14 18:47	7440-70-2	
Copper	**2.0**	mg/L	0.010	0.0022	10	05/13/14 11:46	05/15/14 18:47	7440-50-8	
Iron	**6.8**	mg/L	0.050	0.0080	1	05/13/14 11:46	05/15/14 18:42	7439-89-6	
Lead	**0.013**	mg/L	0.00010	0.000046	1	05/13/14 11:46	05/15/14 18:42	7439-92-1	
Magnesium	**59.5**	mg/L	0.10	0.028	10	05/13/14 11:46	05/15/14 18:47	7439-95-4	
Silver	**0.00010J**	mg/L	0.00050	0.000056	1	05/13/14 11:46	05/15/14 18:42	7440-22-4	
Total Hardness by 2340B	**760**	mg/L	0.71	0.36	10	05/13/14 11:46	05/15/14 18:47		
Uranium-238	**0.014**	mg/L	0.00050	0.00025	1	05/13/14 11:46	05/15/14 18:42	7440-61-1	
Zinc	**5.7**	mg/L	0.25	0.12	50	05/13/14 11:46	05/16/14 10:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/13/14 17:54	05/14/14 14:23	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

QC Batch: MERP/10418 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10266033001, 10266033002, 10266033003

METHOD BLANK: 1679024 Matrix: Water
Associated Lab Samples: 10266033001, 10266033002, 10266033003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	05/14/14 14:10	

LABORATORY CONTROL SAMPLE: 1679025

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1679801 1679802

Parameter	Units	10266033002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0049	99	98	70-130	1	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

QC Batch: MPRP/45782 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10266033001, 10266033002, 10266033003

METHOD BLANK: 1676054 Matrix: Water
Associated Lab Samples: 10266033001, 10266033002, 10266033003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	05/15/14 17:39	
Arsenic	mg/L	ND	0.00050	05/15/14 17:39	
Cadmium	mg/L	ND	0.000080	05/15/14 17:39	
Calcium	mg/L	ND	0.040	05/15/14 17:39	
Copper	mg/L	ND	0.0010	05/15/14 17:39	
Iron	mg/L	ND	0.050	05/15/14 17:39	
Lead	mg/L	ND	0.00010	05/15/14 17:39	
Magnesium	mg/L	ND	0.010	05/15/14 17:39	
Silver	mg/L	ND	0.00050	05/15/14 17:39	
Uranium-238	mg/L	ND	0.00050	05/15/14 17:39	
Zinc	mg/L	ND	0.0050	05/15/14 17:39	

LABORATORY CONTROL SAMPLE: 1676055

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.079	99	85-115	
Cadmium	mg/L	.08	0.080	99	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.079	98	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.080	100	85-115	
Magnesium	mg/L	1	1.0	104	85-115	
Silver	mg/L	.08	0.074	93	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.081	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1676056 1676057

Parameter	Units	10266033001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	ND	.08	.08	0.079	0.082	97	101	70-130	4	20	
Arsenic	mg/L	0.0038	.08	.08	0.083	0.082	99	98	70-130	1	20	
Cadmium	mg/L	0.000081	.08	.08	0.077	0.077	97	96	70-130	.4	20	
Calcium	mg/L	86.8	1	1	88.3	86.2	149	-65	70-130	2	20	E,M1
Copper	mg/L	0.0042	.08	.08	0.079	0.079	94	93	70-130	.8	20	
Iron	mg/L	ND	1	1	0.98	0.96	98	95	70-130	3	20	
Lead	mg/L	ND	.08	.08	0.076	0.076	95	95	70-130	.2	20	
Magnesium	mg/L	28.6	1	1	29.3	28.6	72	8	70-130	2	20	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1676056 1676057

Parameter	Units	10266033001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silver	mg/L	ND	.08	.08	0.070	0.070	88	87	70-130	.9	20	
Uranium-238	mg/L	0.0042	.08	.08	0.082	0.082	98	97	70-130	.7	20	
Zinc	mg/L	0.0091	.08	.08	0.088	0.088	98	99	70-130	.6	20	

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10266033

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10266033001	**LAO-SS-1-050114**	EPA 200.8	MPRP/45782	EPA 200.8	ICPM/19966
10266033002	**LAO-SS-1-050514**	EPA 200.8	MPRP/45782	EPA 200.8	ICPM/19966
10266033003	**LAO-SS-2-050514**	EPA 200.8	MPRP/45782	EPA 200.8	ICPM/19966
10266033001	**LAO-SS-1-050114**	EPA 245.1	MERP/10418	EPA 245.1	MERC/12014
10266033002	**LAO-SS-1-050514**	EPA 245.1	MERP/10418	EPA 245.1	MERC/12014
10266033003	**LAO-SS-2-050514**	EPA 245.1	MERP/10418	EPA 245.1	MERC/12014

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ____ No x
BP Facility No: LAO Wetlands (Weekly)
Lab Work Order Number: 10266033

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burmeister
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-050114	5/1/14	1520		X						2			X	X	001
	LAO-SS-1-050514	5/5/14	11:06		X						2			X	X	002
	LAO-SS-2-050514	5/5/14	11:57		X						1			X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: CJ Kissell, T. Hickey
Sampler's Company: Pioneer Technical Services
Shipment Method: FedEx Ship Date: 5/5/14
Shipment Tracking No: 554092020794

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / PTS	5/5/14	1315	[signature] / Pace	5/6/14	9:03

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals in Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer

Project #: WO#: 10266033

10266033

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:_____

Tracking Number: 554092020794 1

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other:_____ **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A912167504 ☐ 80512447 ☐ 72337080 ☒ B1491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.5 **Cooler Temp Corrected (°C):** 3.5 **Biological Tissue Frozen?** ☐ Yes ☒ No

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** JT 5/6/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # All 2of2, 2of2, 1of1
Per method, VOA pH is checked after analysis				Initial when completed:_____ Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 16:00 Temp:	Corrected Temp: 3.5
Time: 16:05 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 5/7/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

May 27, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10266930

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on May 13, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10266930

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10266930

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10266930001	**LAO-SS-1-050814**	Water	05/08/14 10:30	05/13/14 09:30
10266930002	**LAO-SS-1-051214**	Water	05/12/14 13:50	05/13/14 09:30
10266930003	**LAO-SS-2-051214**	Water	05/12/14 13:27	05/13/14 09:30
10266930004	**LAO-SS-IT-051214**	Water	05/12/14 13:50	05/13/14 09:30
10266930005	**LAO-SS-3-051214**	Water	05/12/14 13:37	05/13/14 09:30
10266930006	**LAO-SS-4-051214**	Water	05/12/14 13:15	05/13/14 09:30

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10266930

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10266930001	**LAO-SS-1-050814**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10266930002	**LAO-SS-1-051214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10266930003	**LAO-SS-2-051214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10266930004	**LAO-SS-IT-051214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10266930005	**LAO-SS-3-051214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	JBB	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10266930006	**LAO-SS-4-051214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	2	PASI-M
		SM 2540C	JBB	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 27, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/45873

B: Analyte was detected in the associated method blank.

- BLANK for HBN 296879 [MPRP/458 (Lab ID: 1679983)
  - Aluminum
  - Copper
  - Magnesium

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/45873

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10266930002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1687227)
  - Calcium
- MSD (Lab ID: 1687228)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: May 27, 2014

Analyte Comments:

QC Batch: MPRP/45873

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1687227)
  - Calcium
- MSD (Lab ID: 1687228)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: May 27, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: May 27, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: May 27, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/35645

D6: The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1683561)
  - Total Dissolved Solids

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: May 27, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10266930

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: May 27, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/18317

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10266930002,10267311002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1684857)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1684859)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1684858)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1684860)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10266930

Sample: LAO-SS-1-050814 **Lab ID: 10266930001** Collected: 05/08/14 10:30 Received: 05/13/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.050**	mg/L	0.010	0.0012	1	05/21/14 12:00	05/23/14 03:27	7429-90-5	
Arsenic	**0.0045**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 03:27	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	05/21/14 12:00	05/23/14 03:27	7440-43-9	
Calcium	**110**	mg/L	0.40	0.084	10	05/21/14 12:00	05/23/14 11:57	7440-70-2	
Copper	**0.011**	mg/L	0.0010	0.00022	1	05/21/14 12:00	05/23/14 03:27	7440-50-8	
Iron	**0.069**	mg/L	0.050	0.0080	1	05/21/14 12:00	05/23/14 03:27	7439-89-6	
Lead	**0.0011**	mg/L	0.00010	0.000046	1	05/21/14 12:00	05/23/14 03:27	7439-92-1	
Magnesium	**30.2**	mg/L	0.10	0.028	10	05/21/14 12:00	05/23/14 11:57	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/21/14 12:00	05/23/14 03:27	7440-22-4	
Total Hardness by 2340B	**398**	mg/L	0.71	0.36	10	05/21/14 12:00	05/23/14 11:57		
Uranium-238	**0.0037**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 03:27	7440-61-1	
Zinc	**0.034**	mg/L	0.0050	0.0025	1	05/21/14 12:00	05/23/14 03:27	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/19/14 17:11	05/20/14 17:07	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10266930

Sample: LAO-SS-1-051214 **Lab ID: 10266930002** Collected: 05/12/14 13:50 Received: 05/13/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.030**	mg/L	0.010	0.0012	1	05/21/14 12:00	05/23/14 02:33	7429-90-5	
Arsenic	**0.0043**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 02:33	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	05/21/14 12:00	05/23/14 02:33	7440-43-9	
Calcium	**117**	mg/L	1.0	0.21	25	05/21/14 12:00	05/23/14 03:05	7440-70-2	M1
Copper	**0.012**	mg/L	0.0010	0.00022	1	05/21/14 12:00	05/23/14 02:33	7440-50-8	
Iron	**0.051**	mg/L	0.050	0.0080	1	05/21/14 12:00	05/23/14 02:33	7439-89-6	
Lead	**0.00084**	mg/L	0.00010	0.000046	1	05/21/14 12:00	05/23/14 02:33	7439-92-1	
Magnesium	**31.9**	mg/L	0.050	0.014	5	05/21/14 12:00	05/23/14 03:00	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	05/21/14 12:00	05/23/14 02:33	7440-22-4	
Total Hardness by 2340B	**422**	mg/L	1.8	0.89	25	05/21/14 12:00	05/23/14 03:05		
Uranium-238	**0.0041**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 02:33	7440-61-1	
Zinc	**0.035**	mg/L	0.0050	0.0025	1	05/21/14 12:00	05/23/14 02:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/19/14 17:11	05/20/14 17:17	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 11:06		
Alkalinity, Total as CaCO3	**35.8**	mg/L	5.0	2.5	1		05/20/14 11:06		
Alkalinity,Bicarbonate (CaCO3)	**30.0**	mg/L	5.0	2.5	1		05/20/14 11:06		
Alkalinity,Carbonate (CaCO3)	**5.8**	mg/L	5.0	2.5	1		05/20/14 11:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**711**	mg/L	10.0	5.0	1		05/17/14 18:16		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**5.0J**	mg/L	10.0	5.0	1		05/16/14 16:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.0**	mg/L	0.10	0.050	1		05/20/14 18:54		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10266930

Sample: LAO-SS-2-051214 **Lab ID: 10266930003** Collected: 05/12/14 13:27 Received: 05/13/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.043**	mg/L	0.010	0.0012	1	05/21/14 12:00	05/23/14 03:36	7429-90-5	
Arsenic	**0.015**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 03:36	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000033	1	05/21/14 12:00	05/23/14 03:36	7440-43-9	
Calcium	**134**	mg/L	0.40	0.084	10	05/21/14 12:00	05/23/14 03:40	7440-70-2	
Copper	**0.36**	mg/L	0.0010	0.00022	1	05/21/14 12:00	05/23/14 03:36	7440-50-8	
Iron	**1.8**	mg/L	0.050	0.0080	1	05/21/14 12:00	05/23/14 03:36	7439-89-6	
Lead	**0.0028**	mg/L	0.00010	0.000046	1	05/21/14 12:00	05/23/14 03:36	7439-92-1	
Magnesium	**35.1**	mg/L	0.10	0.028	10	05/21/14 12:00	05/23/14 03:40	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/21/14 12:00	05/23/14 03:36	7440-22-4	
Total Hardness by 2340B	**479**	mg/L	0.71	0.36	10	05/21/14 12:00	05/23/14 03:40		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 03:36	7440-61-1	
Zinc	**5.3**	mg/L	0.25	0.12	50	05/21/14 12:00	05/23/14 03:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/19/14 17:11	05/20/14 17:19	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 11:43		
Alkalinity, Total as CaCO3	**112**	mg/L	5.0	2.5	1		05/20/14 11:43		
Alkalinity,Bicarbonate (CaCO3)	**112**	mg/L	5.0	2.5	1		05/20/14 11:43		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 11:43		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**681**	mg/L	10.0	5.0	1		05/17/14 18:16		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**9.0J**	mg/L	10.0	5.0	1		05/16/14 16:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		05/20/14 18:59		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10266930

Sample: LAO-SS-IT-051214 **Lab ID: 10266930004** Collected: 05/12/14 13:50 Received: 05/13/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.015**	mg/L	0.010	0.0012	1	05/21/14 12:00	05/23/14 03:50	7429-90-5	B
Arsenic	**0.0041**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 03:50	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000033	1	05/21/14 12:00	05/23/14 03:50	7440-43-9	
Calcium	**112**	mg/L	0.40	0.084	10	05/21/14 12:00	05/23/14 03:54	7440-70-2	
Copper	**0.011**	mg/L	0.0010	0.00022	1	05/21/14 12:00	05/23/14 03:50	7440-50-8	
Iron	**0.038J**	mg/L	0.050	0.0080	1	05/21/14 12:00	05/23/14 03:50	7439-89-6	
Lead	**0.00059**	mg/L	0.00010	0.000046	1	05/21/14 12:00	05/23/14 03:50	7439-92-1	
Magnesium	**31.9**	mg/L	0.10	0.028	10	05/21/14 12:00	05/23/14 03:54	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/21/14 12:00	05/23/14 03:50	7440-22-4	
Total Hardness by 2340B	**410**	mg/L	0.71	0.36	10	05/21/14 12:00	05/23/14 03:54		
Uranium-238	**0.0040**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 03:50	7440-61-1	
Zinc	**0.034**	mg/L	0.0050	0.0025	1	05/21/14 12:00	05/23/14 03:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/19/14 17:11	05/20/14 17:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 11:47		
Alkalinity, Total as CaCO3	**35.6**	mg/L	5.0	2.5	1		05/20/14 11:47		
Alkalinity,Bicarbonate (CaCO3)	**29.5**	mg/L	5.0	2.5	1		05/20/14 11:47		
Alkalinity,Carbonate (CaCO3)	**6.1**	mg/L	5.0	2.5	1		05/20/14 11:47		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**728**	mg/L	10.0	5.0	1		05/17/14 18:16		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		05/16/14 16:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.0**	mg/L	0.10	0.050	1		05/20/14 19:03		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10266930

Sample: LAO-SS-3-051214 **Lab ID: 10266930005** Collected: 05/12/14 13:37 Received: 05/13/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.34**	mg/L	0.010	0.0012	1	05/21/14 12:00	05/23/14 04:14	7429-90-5	
Arsenic	**0.0037**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 04:14	7440-38-2	
Cadmium	**0.038**	mg/L	0.000080	0.000033	1	05/21/14 12:00	05/23/14 04:14	7440-43-9	
Calcium	**134**	mg/L	0.40	0.084	10	05/21/14 12:00	05/23/14 04:18	7440-70-2	
Copper	**1.9**	mg/L	0.010	0.0022	10	05/21/14 12:00	05/23/14 04:18	7440-50-8	
Iron	**10**	mg/L	0.050	0.0080	1	05/21/14 12:00	05/23/14 04:14	7439-89-6	
Lead	**0.0025**	mg/L	0.00010	0.000046	1	05/21/14 12:00	05/23/14 04:14	7439-92-1	
Magnesium	**35.6**	mg/L	0.10	0.028	10	05/21/14 12:00	05/23/14 04:18	7439-95-4	
Silver	**0.000088J**	mg/L	0.00050	0.000056	1	05/21/14 12:00	05/23/14 04:14	7440-22-4	
Total Hardness by 2340B	**482**	mg/L	0.71	0.36	10	05/21/14 12:00	05/23/14 04:18		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 04:14	7440-61-1	
Zinc	**7.8**	mg/L	0.25	0.12	50	05/21/14 12:00	05/23/14 04:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/19/14 17:11	05/20/14 17:23	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 11:56		
Alkalinity, Total as CaCO3	**75.5**	mg/L	5.0	2.5	1		05/20/14 11:56		
Alkalinity,Bicarbonate (CaCO3)	**75.5**	mg/L	5.0	2.5	1		05/20/14 11:56		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 11:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**844**	mg/L	10.0	5.0	1		05/19/14 15:59		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**26.0**	mg/L	10.0	5.0	1		05/16/14 16:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.9**	mg/L	0.10	0.050	1		05/20/14 19:04		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10266930

Sample: LAO-SS-4-051214 **Lab ID: 10266930006** Collected: 05/12/14 13:15 Received: 05/13/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0024J**	mg/L	0.010	0.0012	1	05/21/14 12:00	05/23/14 02:28	7429-90-5	B
Arsenic	ND	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 02:28	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	05/21/14 12:00	05/23/14 02:28	7440-43-9	
Calcium	ND	mg/L	0.040	0.0084	1	05/21/14 12:00	05/23/14 02:28	7440-70-2	
Copper	**0.00022J**	mg/L	0.0010	0.00022	1	05/21/14 12:00	05/23/14 02:28	7440-50-8	B
Iron	ND	mg/L	0.050	0.0080	1	05/21/14 12:00	05/23/14 02:28	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	05/21/14 12:00	05/23/14 02:28	7439-92-1	
Magnesium	**0.0032J**	mg/L	0.010	0.0028	1	05/21/14 12:00	05/23/14 02:28	7439-95-4	B
Silver	ND	mg/L	0.00050	0.000056	1	05/21/14 12:00	05/23/14 02:28	7440-22-4	
Total Hardness by 2340B	ND	mg/L	0.071	0.036	1	05/21/14 12:00	05/23/14 02:28		
Uranium-238	ND	mg/L	0.00050	0.00025	1	05/21/14 12:00	05/23/14 02:28	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	05/21/14 12:00	05/23/14 02:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/19/14 17:11	05/20/14 17:25	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		05/20/14 15:16		
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	2.5	1		05/20/14 15:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		05/19/14 15:59		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		05/16/14 16:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.064J**	mg/L	0.10	0.050	1		05/20/14 19:04		

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: MERP/10432 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10266930001, 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

METHOD BLANK: 1681102 Matrix: Water
Associated Lab Samples: 10266930001, 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	05/20/14 17:03	

LABORATORY CONTROL SAMPLE: 1681103

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0046	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1681104 1681105

Parameter	Units	10266930001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0048	0.0049	95	98	70-130	3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: MPRP/45873 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10266930001, 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

METHOD BLANK: 1679983 Matrix: Water
Associated Lab Samples: 10266930001, 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0018J	0.010	05/23/14 02:24	
Arsenic	mg/L	ND	0.00050	05/23/14 02:24	
Cadmium	mg/L	ND	0.000080	05/23/14 02:24	
Calcium	mg/L	0.0097J	0.040	05/23/14 02:24	
Copper	mg/L	0.00029J	0.0010	05/23/14 02:24	
Iron	mg/L	ND	0.050	05/23/14 02:24	
Lead	mg/L	ND	0.00010	05/23/14 02:24	
Magnesium	mg/L	0.0032J	0.010	05/23/14 02:24	
Silver	mg/L	ND	0.00050	05/23/14 02:24	
Uranium-238	mg/L	ND	0.00050	05/23/14 02:24	
Zinc	mg/L	ND	0.0050	05/23/14 02:24	

LABORATORY CONTROL SAMPLE: 1679984

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.074	92	85-115	
Arsenic	mg/L	.08	0.082	103	85-115	
Cadmium	mg/L	.08	0.085	106	85-115	
Calcium	mg/L	1	0.94	94	85-115	
Copper	mg/L	.08	0.080	101	85-115	
Iron	mg/L	1	1.1	106	85-115	
Lead	mg/L	.08	0.084	105	85-115	
Magnesium	mg/L	1	1.1	107	85-115	
Silver	mg/L	.08	0.085	107	85-115	
Uranium-238	mg/L	.08	0.080	100	85-115	
Zinc	mg/L	.08	0.085	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1687227 1687228

Parameter	Units	10266930002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.030	.08	.08	0.11	0.11	100	96	70-130	3	20	
Arsenic	mg/L	0.0043	.08	.08	0.087	0.086	103	102	70-130	2	20	
Cadmium	mg/L	0.00014	.08	.08	0.082	0.080	102	99	70-130	2	20	
Calcium	mg/L	117	1	1	115	119	-122	250	70-130	3	20	E,M1
Copper	mg/L	0.012	.08	.08	0.089	0.087	96	94	70-130	2	20	
Iron	mg/L	0.051	1	1	1.1	1.1	107	102	70-130	5	20	
Lead	mg/L	0.00084	.08	.08	0.079	0.079	98	97	70-130	.8	20	
Magnesium	mg/L	31.9	1	1	33.0	34.0	108	202	70-130	3	20	M1
Silver	mg/L	ND	.08	.08	0.080	0.078	100	98	70-130	2	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1687227 1687228

Parameter	Units	10266930002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Uranium-238	mg/L	0.0041	.08	.08	0.081	0.081	97	96	70-130	.3	20	
Zinc	mg/L	0.035	.08	.08	0.12	0.12	103	101	70-130	1	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: WET/35698 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

METHOD BLANK: 1684652 Matrix: Water
Associated Lab Samples: 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	05/20/14 08:32	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	05/20/14 08:32	

LABORATORY CONTROL SAMPLE & LCSD: 1684653 1684655

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	40.7	41.8	102	104	90-110	3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1684656 1684657

Parameter	Units	10266638007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	227	40	40	263	260	91	81	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1684658 1684659

Parameter	Units	10266930004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	35.6	40	40	68.7	68.2	83	82	80-120	.8	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: WET/35645 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10266930002, 10266930003, 10266930004

METHOD BLANK: 1683559 Matrix: Water
Associated Lab Samples: 10266930002, 10266930003, 10266930004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	05/17/14 18:16	

LABORATORY CONTROL SAMPLE: 1683560

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	972	97	80-120	

SAMPLE DUPLICATE: 1683561

Parameter	Units	10267402001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	195	234	18	10	D6

SAMPLE DUPLICATE: 1683562

Parameter	Units	10266997006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	242	258	6	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: WET/35646 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10266930005, 10266930006

METHOD BLANK: 1683567 | Matrix: Water
Associated Lab Samples: 10266930005, 10266930006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	05/19/14 15:59	

LABORATORY CONTROL SAMPLE: 1683568

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	998	100	80-120	

SAMPLE DUPLICATE: 1683569

Parameter	Units	10266930005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	844	861	2	10	

SAMPLE DUPLICATE: 1683570

Parameter	Units	10267099001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	679	680	.1	10	

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(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: WET/35637 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

METHOD BLANK: 1683111 Matrix: Water
Associated Lab Samples: 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	05/16/14 16:22	

LABORATORY CONTROL SAMPLE: 1683112

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	106	106	80-120	

SAMPLE DUPLICATE: 1683113

Parameter	Units	10266930002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.0J	5.0J		10	

SAMPLE DUPLICATE: 1683114

Parameter	Units	10267099001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	14.0	13.0	7	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10266930

QC Batch: WETA/18317 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

METHOD BLANK: 1684855 | Matrix: Water
Associated Lab Samples: 10266930002, 10266930003, 10266930004, 10266930005, 10266930006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	05/20/14 18:49	

LABORATORY CONTROL SAMPLE: 1684856

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1684857 1684858

Parameter	Units	10266930002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.0	2.5	2.5	1.8	2.0	33	39	80-120	8	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1684859 1684860

Parameter	Units	10267311002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.60	2.5	2.5	1.4	1.3	32	28	80-120	7	30	M1

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10266930

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10266930

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10266930001	**LAO-SS-1-050814**	EPA 200.8	MPRP/45873	EPA 200.8	ICPM/20064
10266930002	**LAO-SS-1-051214**	EPA 200.8	MPRP/45873	EPA 200.8	ICPM/20064
10266930003	**LAO-SS-2-051214**	EPA 200.8	MPRP/45873	EPA 200.8	ICPM/20064
10266930004	**LAO-SS-IT-051214**	EPA 200.8	MPRP/45873	EPA 200.8	ICPM/20064
10266930005	**LAO-SS-3-051214**	EPA 200.8	MPRP/45873	EPA 200.8	ICPM/20064
10266930006	**LAO-SS-4-051214**	EPA 200.8	MPRP/45873	EPA 200.8	ICPM/20064
10266930001	**LAO-SS-1-050814**	EPA 245.1	MERP/10432	EPA 245.1	MERC/12054
10266930002	**LAO-SS-1-051214**	EPA 245.1	MERP/10432	EPA 245.1	MERC/12054
10266930003	**LAO-SS-2-051214**	EPA 245.1	MERP/10432	EPA 245.1	MERC/12054
10266930004	**LAO-SS-IT-051214**	EPA 245.1	MERP/10432	EPA 245.1	MERC/12054
10266930005	**LAO-SS-3-051214**	EPA 245.1	MERP/10432	EPA 245.1	MERC/12054
10266930006	**LAO-SS-4-051214**	EPA 245.1	MERP/10432	EPA 245.1	MERC/12054
10266930002	**LAO-SS-1-051214**	SM 2320B	WET/35698		
10266930003	**LAO-SS-2-051214**	SM 2320B	WET/35698		
10266930004	**LAO-SS-IT-051214**	SM 2320B	WET/35698		
10266930005	**LAO-SS-3-051214**	SM 2320B	WET/35698		
10266930006	**LAO-SS-4-051214**	SM 2320B	WET/35698		
10266930002	**LAO-SS-1-051214**	SM 2540C	WET/35645		
10266930003	**LAO-SS-2-051214**	SM 2540C	WET/35645		
10266930004	**LAO-SS-IT-051214**	SM 2540C	WET/35645		
10266930005	**LAO-SS-3-051214**	SM 2540C	WET/35646		
10266930006	**LAO-SS-4-051214**	SM 2540C	WET/35646		
10266930002	**LAO-SS-1-051214**	SM 2540D	WET/35637		
10266930003	**LAO-SS-2-051214**	SM 2540D	WET/35637		
10266930004	**LAO-SS-IT-051214**	SM 2540D	WET/35637		
10266930005	**LAO-SS-3-051214**	SM 2540D	WET/35637		
10266930006	**LAO-SS-4-051214**	SM 2540D	WET/35637		
10266930002	**LAO-SS-1-051214**	SM 4500-NO3 H	WETA/18317		
10266930003	**LAO-SS-2-051214**	SM 4500-NO3 H	WETA/18317		
10266930004	**LAO-SS-IT-051214**	SM 4500-NO3 H	WETA/18317		
10266930005	**LAO-SS-3-051214**	SM 4500-NO3 H	WETA/18317		
10266930006	**LAO-SS-4-051214**	SM 4500-NO3 H	WETA/18317		

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Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10260930

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burmeister

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate + Nitrite	TDS/TSS/Alkalinity					Comments
	LAO-SS-1 -050814	5/8/14	1030		X			2			2			X			X							001
	LAO-SS-1 -051214	5/12/14	1350		X			4	X	X	2			X	X	X	X	X	X					002
	LAO-SS-2 -051214		1527		X			3	1	1	1			X	X	X		X	X					003
	LAO-SS-1T-051214		1350		X			3	1	1	1			X	X	X		X	X					004
	LAO-SS-3-051214		1337		X			3	1	1	1			X	X	X		X	X					005
	LAO-SS-4-051214		1315		X			3	1	1	1			X	X	X		X	X					006

Sampler's Name: DJ Renz + CJ Kissell	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] PTS	5/12/14		[signature] Pace	5/12/14	9:30
Shipment Method: FED Ex Ship Date: 5/12/14				[signature] 5-12-14	5-13-14	
Shipment Tracking No: 5540 9202 0761						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 6.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO# : 10266930

10266930

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: 5540 9202 0761

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ B88A912167504 1491 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 6.0 VP 5.13.14 **Cooler Temp Corrected (°C):** 6.0 **Biological Tissue Frozen?** ☐ Yes ☑ No

Temp should be above freezing to 6°C **Correction Factor:** 0.0 **Date and Initials of Person Examining Contents:** JP 5.13.14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8. no ms/msd received
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☐ HNO_3 ☑ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☑ Yes	☐ No	☐ N/A	Sample # 1+2: 2/2 1/1 3-6: 1/1 1/1
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 13:30 Temp: 6.0	Corrected Temp: 6.0
Time: put in cooler	
Time: 13:41 Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 5/13/14.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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June 02, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on May 20, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10267911001	**LAO-SS-1-051514**	Water	05/15/14 12:37	05/20/14 09:35
10267911002	**LAO-SS-1-051914**	Water	05/19/14 10:45	05/20/14 09:35
10267911003	**LAO-SS-2-051914**	Water	05/19/14 11:45	05/20/14 09:35

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10267911001	**LAO-SS-1-051514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10267911002	**LAO-SS-1-051914**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10267911003	**LAO-SS-2-051914**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 02, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/46103

B: Analyte was detected in the associated method blank.

- BLANK for HBN 298353 [MPRP/461 (Lab ID: 1687822)
  - Aluminum
  - Iron

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/46103

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10267585001,10267911001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1687824)
  - Aluminum
- MS (Lab ID: 1687826)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1687825)
  - Aluminum
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 02, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/46103

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1687826)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: June 02, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Sample: LAO-SS-1-051514 **Lab ID: 10267911001** Collected: 05/15/14 12:37 Received: 05/20/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0074J**	mg/L	0.010	0.0012	1	05/28/14 10:53	05/29/14 19:57	7429-90-5	B
Arsenic	**0.0044**	mg/L	0.00050	0.00025	1	05/28/14 10:53	05/29/14 19:57	7440-38-2	
Cadmium	**0.00010**	mg/L	0.000080	0.000033	1	05/28/14 10:53	05/29/14 19:57	7440-43-9	
Calcium	**113**	mg/L	0.40	0.084	10	05/28/14 10:53	05/29/14 20:06	7440-70-2	M1
Copper	**0.0077**	mg/L	0.0010	0.00022	1	05/28/14 10:53	05/29/14 19:57	7440-50-8	
Iron	**0.032J**	mg/L	0.050	0.0080	1	05/28/14 10:53	05/29/14 19:57	7439-89-6	B
Lead	**0.00031**	mg/L	0.00010	0.000046	1	05/28/14 10:53	05/29/14 19:57	7439-92-1	
Magnesium	**29.4**	mg/L	0.10	0.028	10	05/28/14 10:53	05/29/14 20:06	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	05/28/14 10:53	05/29/14 19:57	7440-22-4	
Total Hardness by 2340B	**403**	mg/L	0.71	0.36	10	05/28/14 10:53	05/29/14 20:06		
Uranium-238	**0.0041**	mg/L	0.00050	0.00025	1	05/28/14 10:53	05/29/14 19:57	7440-61-1	
Zinc	**0.023**	mg/L	0.0050	0.0025	1	05/28/14 10:53	05/29/14 19:57	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/28/14 17:03	05/30/14 14:14	7439-97-6	

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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Sample: LAO-SS-1-051914 **Lab ID: 10267911002** Collected: 05/19/14 10:45 Received: 05/20/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.025**	mg/L	0.010	0.0012	1	05/28/14 10:53	05/29/14 20:20	7429-90-5	
Arsenic	**0.0040**	mg/L	0.00050	0.00025	1	05/28/14 10:53	05/29/14 20:20	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000033	1	05/28/14 10:53	05/29/14 20:20	7440-43-9	
Calcium	**113**	mg/L	0.40	0.084	10	05/28/14 10:53	05/29/14 20:24	7440-70-2	
Copper	**0.011**	mg/L	0.0010	0.00022	1	05/28/14 10:53	05/29/14 20:20	7440-50-8	
Iron	**0.10**	mg/L	0.050	0.0080	1	05/28/14 10:53	05/29/14 20:20	7439-89-6	B
Lead	**0.00068**	mg/L	0.00010	0.000046	1	05/28/14 10:53	05/29/14 20:20	7439-92-1	
Magnesium	**29.0**	mg/L	0.10	0.028	10	05/28/14 10:53	05/29/14 20:24	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/28/14 10:53	05/29/14 20:20	7440-22-4	
Total Hardness by 2340B	**402**	mg/L	0.71	0.36	10	05/28/14 10:53	05/29/14 20:24		
Uranium-238	**0.0028**	mg/L	0.00050	0.00025	1	05/28/14 10:53	05/29/14 20:20	7440-61-1	
Zinc	**0.028**	mg/L	0.0050	0.0025	1	05/28/14 10:53	05/29/14 20:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/28/14 17:03	05/30/14 14:16	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Sample: LAO-SS-2-051914 **Lab ID: 10267911003** Collected: 05/19/14 11:45 Received: 05/20/14 09:35 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.15**	mg/L	0.010	0.0012	1	05/28/14 10:53	05/29/14 20:29	7429-90-5	
Arsenic	**0.032**	mg/L	0.00050	0.00025	1	05/28/14 10:53	05/29/14 20:29	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	05/28/14 10:53	05/29/14 20:29	7440-43-9	
Calcium	**133**	mg/L	0.40	0.084	10	05/28/14 10:53	05/29/14 20:33	7440-70-2	
Copper	**0.76**	mg/L	0.010	0.0022	10	05/28/14 10:53	05/29/14 20:33	7440-50-8	
Iron	**4.2**	mg/L	0.050	0.0080	1	05/28/14 10:53	05/29/14 20:29	7439-89-6	
Lead	**0.0068**	mg/L	0.00010	0.000046	1	05/28/14 10:53	05/29/14 20:29	7439-92-1	
Magnesium	**31.3**	mg/L	0.10	0.028	10	05/28/14 10:53	05/29/14 20:33	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	05/28/14 10:53	05/29/14 20:29	7440-22-4	
Total Hardness by 2340B	**461**	mg/L	0.71	0.36	10	05/28/14 10:53	05/29/14 20:33		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	05/28/14 10:53	05/29/14 20:29	7440-61-1	
Zinc	**5.4**	mg/L	0.25	0.12	50	05/28/14 10:53	05/29/14 20:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	05/28/14 17:03	05/30/14 14:18	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

QC Batch: MERP/10525 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10267911001, 10267911002, 10267911003

METHOD BLANK: 1689525 | Matrix: Water
Associated Lab Samples: 10267911001, 10267911002, 10267911003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	05/30/14 14:10	

LABORATORY CONTROL SAMPLE: 1689526

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1689527 1689528

Parameter	Units	10267911003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0050	103	100	70-130	3	20	

MATRIX SPIKE SAMPLE: 1689529

Parameter	Units	10268227048 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0051	102	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

QC Batch: MPRP/46103 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10267911001, 10267911002, 10267911003

METHOD BLANK: 1687822 Matrix: Water
Associated Lab Samples: 10267911001, 10267911002, 10267911003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0021J	0.010	05/29/14 18:34	
Arsenic	mg/L	ND	0.00050	05/29/14 18:34	
Cadmium	mg/L	ND	0.000080	05/29/14 18:34	
Calcium	mg/L	0.013J	0.040	05/29/14 18:34	
Copper	mg/L	0.00024J	0.0010	05/29/14 18:34	
Iron	mg/L	0.020J	0.050	05/29/14 18:34	
Lead	mg/L	ND	0.00010	05/29/14 18:34	
Magnesium	mg/L	ND	0.010	05/29/14 18:34	
Silver	mg/L	ND	0.00050	05/29/14 18:34	
Uranium-238	mg/L	ND	0.00050	05/29/14 18:34	
Zinc	mg/L	ND	0.0050	05/29/14 18:34	

LABORATORY CONTROL SAMPLE: 1687823

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.077	96	85-115	
Arsenic	mg/L	.08	0.078	97	85-115	
Cadmium	mg/L	.08	0.077	96	85-115	
Calcium	mg/L	1	0.92	92	85-115	
Copper	mg/L	.08	0.077	96	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.077	96	85-115	
Magnesium	mg/L	1	0.96	96	85-115	
Silver	mg/L	.08	0.076	95	85-115	
Uranium-238	mg/L	.08	0.078	98	85-115	
Zinc	mg/L	.08	0.077	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1687824 1687825

Parameter	Units	10267585001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	722 ug/L	.08	.08	1.0	1.0	350	382	70-130	3	20	M1
Arsenic	mg/L	5.1 ug/L	.08	.08	0.086	0.088	102	103	70-130	1	20	
Cadmium	mg/L	0.17 ug/L	.08	.08	0.079	0.080	98	99	70-130	.8	20	
Calcium	mg/L	20500 ug/L	1	1	21.3	21.1	85	63	70-130	1	20	M1
Copper	mg/L	0.020	.08	.08	0.10	0.099	100	98	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1687824 1687825

Parameter	Units	10267585001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	976 ug/L	1	1	2.1	2.1	109	108	70-130	.7	20	
Lead	mg/L	21.2 ug/L	.08	.08	0.10	0.10	99	100	70-130	.2	20	
Magnesium	mg/L	7080 ug/L	1	1	8.1	8.0	103	91	70-130	2	20	
Silver	mg/L	0.37J ug/L	.08	.08	0.079	0.079	98	98	70-130	.1	20	
Uranium-238	mg/L	0.29J ug/L	.08	.08	0.080	0.079	99	98	70-130	1	20	
Zinc	mg/L	84.2 ug/L	.08	.08	0.17	0.17	101	103	70-130	1	20	

MATRIX SPIKE SAMPLE: 1687826

Parameter	Units	10267911001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.0074J	.08	0.084	96	70-130	
Arsenic	mg/L	0.0044	.08	0.085	101	70-130	
Cadmium	mg/L	0.00010	.08	0.077	96	70-130	
Calcium	mg/L	113	1	112	-120	70-130	E,M1
Copper	mg/L	0.0077	.08	0.084	95	70-130	
Iron	mg/L	0.032J	1	0.99	96	70-130	
Lead	mg/L	0.00031	.08	0.077	96	70-130	
Magnesium	mg/L	29.4	1	29.1	-31	70-130	M1
Silver	mg/L	ND	.08	0.075	94	70-130	
Uranium-238	mg/L	0.0041	.08	0.083	99	70-130	
Zinc	mg/L	0.023	.08	0.10	96	70-130	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10267911

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10267911001	**LAO-SS-1-051514**	EPA 200.8	MPRP/46103	EPA 200.8	ICPM/20180
10267911002	**LAO-SS-1-051914**	EPA 200.8	MPRP/46103	EPA 200.8	ICPM/20180
10267911003	**LAO-SS-2-051914**	EPA 200.8	MPRP/46103	EPA 200.8	ICPM/20180
10267911001	**LAO-SS-1-051514**	EPA 245.1	MERP/10525	EPA 245.1	MERC/12127
10267911002	**LAO-SS-1-051914**	EPA 245.1	MERP/10525	EPA 245.1	MERC/12127
10267911003	**LAO-SS-2-051914**	EPA 245.1	MERP/10525	EPA 245.1	MERC/12127

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10267911

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burmeister

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-051514	5/15/14	1237		X						2			X	X	001
	LAO-SS-1-051914	5/19/14	1045		X						2			X	X	002
	LAO-SS-2-051914	5/19/14	1145		X						1			X		003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: CJ Kissell + T. Hickey						
Sampler's Company: Pioneer Technical Services	IPTS	5/19/14	1330	Pace	5/20/14	935
Shipment Method: FedEx Ship Date: 5/19/14						
Shipment Tracking No: 5540 9202 0750						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO# : 10267911

10267911

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 5202 0750

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☐ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.0 **Cooler Temp Corrected (°C):** 3.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** EM 5/20/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 10:31 Temp: 3.0	Corrected Temp: 3.2
Time: 10:37 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 5/20/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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June 12, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on May 29, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10268921001	**LAO-SS-1-052214**	Water	05/22/14 12:30	05/29/14 10:00
10268921002	**LAO-SS-1-052614**	Water	05/26/14 09:25	05/29/14 10:00
10268921003	**LAO-SS-2-052614**	Water	05/26/14 09:40	05/29/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10268921001	**LAO-SS-1-052214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10268921002	**LAO-SS-1-052614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10268921003	**LAO-SS-2-052614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 12, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/46395

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10268921001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1699283)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1699284)
  - Calcium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/46395

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1699283)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 12, 2014

Analyte Comments:

QC Batch: MPRP/46395

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1699284)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: June 12, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Sample: LAO-SS-1-052214 **Lab ID: 10268921001** Collected: 05/22/14 12:30 Received: 05/29/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.054**	mg/L	0.010	0.0012	1	06/05/14 13:05	06/12/14 10:05	7429-90-5	
Arsenic	**0.0048**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 10:49	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	06/05/14 13:05	06/11/14 10:49	7440-43-9	
Calcium	**111**	mg/L	0.20	0.042	5	06/05/14 13:05	06/11/14 11:08	7440-70-2	M1
Copper	**0.014**	mg/L	0.0010	0.00022	1	06/05/14 13:05	06/11/14 10:49	7440-50-8	
Iron	**0.079**	mg/L	0.050	0.0080	1	06/05/14 13:05	06/11/14 10:49	7439-89-6	
Lead	**0.0015**	mg/L	0.00010	0.000046	1	06/05/14 13:05	06/11/14 10:49	7439-92-1	
Magnesium	**29.4**	mg/L	0.050	0.014	5	06/05/14 13:05	06/11/14 11:08	7439-95-4	M1
Silver	**0.000065J**	mg/L	0.00050	0.000056	1	06/05/14 13:05	06/11/14 10:49	7440-22-4	
Total Hardness by 2340B	**398**	mg/L	0.36	0.18	5	06/05/14 13:05	06/11/14 11:08		
Uranium-238	**0.0023**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 10:49	7440-61-1	
Zinc	**0.040**	mg/L	0.0050	0.0025	1	06/05/14 13:05	06/11/14 10:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/05/14 12:57	06/05/14 16:49	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Sample: LAO-SS-1-052614 **Lab ID: 10268921002** Collected: 05/26/14 09:25 Received: 05/29/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0072J**	mg/L	0.010	0.0012	1	06/05/14 13:05	06/12/14 10:20	7429-90-5	
Arsenic	**0.0045**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 10:12	7440-38-2	
Cadmium	**0.00011**	mg/L	0.000080	0.000033	1	06/05/14 13:05	06/11/14 10:12	7440-43-9	
Calcium	**112**	mg/L	0.40	0.084	10	06/05/14 13:05	06/11/14 10:16	7440-70-2	
Copper	**0.0082**	mg/L	0.0010	0.00022	1	06/05/14 13:05	06/11/14 10:12	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0080	1	06/05/14 13:05	06/11/14 10:12	7439-89-6	
Lead	**0.00047**	mg/L	0.00010	0.000046	1	06/05/14 13:05	06/11/14 10:12	7439-92-1	
Magnesium	**29.9**	mg/L	0.10	0.028	10	06/05/14 13:05	06/11/14 10:16	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/05/14 13:05	06/11/14 10:12	7440-22-4	
Total Hardness by 2340B	**404**	mg/L	0.71	0.36	10	06/05/14 13:05	06/11/14 10:16		
Uranium-238	**0.0024**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 10:12	7440-61-1	
Zinc	**0.019**	mg/L	0.0050	0.0025	1	06/05/14 13:05	06/11/14 10:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/05/14 12:57	06/05/14 16:51	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Sample: LAO-SS-2-052614 **Lab ID: 10268921003** Collected: 05/26/14 09:40 Received: 05/29/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.039**	mg/L	0.020	0.0023	2	06/05/14 13:05	06/12/14 10:24	7429-90-5	
Arsenic	**0.017**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 10:20	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000033	1	06/05/14 13:05	06/11/14 10:20	7440-43-9	
Calcium	**139**	mg/L	0.40	0.084	10	06/05/14 13:05	06/11/14 10:25	7440-70-2	
Copper	**0.34**	mg/L	0.0010	0.00022	1	06/05/14 13:05	06/11/14 10:20	7440-50-8	
Iron	**1.7**	mg/L	0.050	0.0080	1	06/05/14 13:05	06/11/14 10:20	7439-89-6	
Lead	**0.0023**	mg/L	0.00010	0.000046	1	06/05/14 13:05	06/11/14 10:20	7439-92-1	
Magnesium	**33.3**	mg/L	0.020	0.0057	2	06/05/14 13:05	06/12/14 10:24	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/05/14 13:05	06/11/14 10:20	7440-22-4	
Total Hardness by 2340B	**484**	mg/L	0.71	0.36	10	06/05/14 13:05	06/11/14 10:25		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 10:20	7440-61-1	
Zinc	**4.8**	mg/L	0.25	0.12	50	06/05/14 13:05	06/11/14 10:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/05/14 12:57	06/05/14 16:54	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

QC Batch: MERP/10612 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10268921001, 10268921002, 10268921003

METHOD BLANK: 1699129 | Matrix: Water
Associated Lab Samples: 10268921001, 10268921002, 10268921003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	06/05/14 16:44	

LABORATORY CONTROL SAMPLE: 1699130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699131 1699132

Parameter	Units	10268921003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0050	98	99	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

QC Batch: MPRP/46395 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10268921001, 10268921002, 10268921003

METHOD BLANK: 1699281 Matrix: Water
Associated Lab Samples: 10268921001, 10268921002, 10268921003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	06/11/14 10:07	
Arsenic	mg/L	ND	0.00050	06/11/14 10:07	
Cadmium	mg/L	ND	0.000080	06/11/14 10:07	
Calcium	mg/L	0.013J	0.040	06/11/14 10:07	
Copper	mg/L	ND	0.0010	06/11/14 10:07	
Iron	mg/L	ND	0.050	06/11/14 10:07	
Lead	mg/L	ND	0.00010	06/11/14 10:07	
Magnesium	mg/L	ND	0.010	06/11/14 10:07	
Silver	mg/L	ND	0.00050	06/11/14 10:07	
Uranium-238	mg/L	ND	0.00050	06/11/14 10:07	
Zinc	mg/L	ND	0.0050	06/11/14 10:07	

LABORATORY CONTROL SAMPLE: 1699282

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	107	85-115	
Arsenic	mg/L	.08	0.087	108	85-115	
Cadmium	mg/L	.08	0.089	112	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.088	110	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.087	109	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Silver	mg/L	.08	0.084	104	85-115	
Uranium-238	mg/L	.08	0.085	106	85-115	
Zinc	mg/L	.08	0.089	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699283 1699284

Parameter	Units	10268921001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.054	.08	.08	0.15	0.15	122	122	70-130	.3	20	
Arsenic	mg/L	0.0048	.08	.08	0.091	0.091	107	108	70-130	.7	20	
Cadmium	mg/L	0.00015	.08	.08	0.086	0.087	107	108	70-130	1	20	
Calcium	mg/L	111	1	1	111	111	3	-7	70-130	.09	20	E,M1
Copper	mg/L	0.014	.08	.08	0.098	0.099	106	106	70-130	.4	20	
Iron	mg/L	0.079	1	1	1.2	1.1	112	104	70-130	6	20	
Lead	mg/L	0.0015	.08	.08	0.085	0.085	104	105	70-130	.4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699283 1699284

Parameter	Units	10268921001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	29.4	1	1	30.1	30.1	67	71	70-130	.1	20	M1
Silver	mg/L	0.000065J	.08	.08	0.079	0.080	99	100	70-130	1	20	
Uranium-238	mg/L	0.0023	.08	.08	0.085	0.085	103	104	70-130	.6	20	
Zinc	mg/L	0.040	.08	.08	0.12	0.12	102	102	70-130	.2	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10268921

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10268921001	**LAO-SS-1-052214**	EPA 200.8	MPRP/46395	EPA 200.8	ICPM/20376
10268921002	**LAO-SS-1-052614**	EPA 200.8	MPRP/46395	EPA 200.8	ICPM/20376
10268921003	**LAO-SS-2-052614**	EPA 200.8	MPRP/46395	EPA 200.8	ICPM/20376
10268921001	**LAO-SS-1-052214**	EPA 245.1	MERP/10612	EPA 245.1	MERC/12222
10268921002	**LAO-SS-1-052614**	EPA 245.1	MERP/10612	EPA 245.1	MERC/12222
10268921003	**LAO-SS-2-052614**	EPA 245.1	MERP/10612	EPA 245.1	MERC/12222

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10266921

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Bornmeister

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 - 052214	5/22/14	12:30		X						2				X	X	CU
	LAO-SS-1 - 052614	5/26/14	9:25		X						2				X	X	CU
	LAO-SS-2 - 052614	5/26/14	9:40		X						1				X		CU

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ RENZ + STEVE LUBICK						
Sampler's Company: Pioneer Technical Services	[illegible] /PTS	5/28/14	10:30	[illegible]	5/28/14	1000
Shipment Method: FedEx Ship Date: 5/28/14						
Shipment Tracking No: 5540 9202 0740						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 9.7 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 09May2014 Page 1 of 1
	Document No.: F-MN-L-210-rev.12	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10268921

10268921

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0740

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☒ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 9.6 **Cooler Temp Corrected (°C):** 9.7 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** EJL 5/29/30

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # all, 2of2, 2of2, 1of1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 13:44	Temp: 9.7	Corrected Temp: 9.7 5/29
Time: 13:48	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 5/29/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 16, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on June 03, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10269379001	**LAO-SS-1-052914**	Water	05/29/14 11:28	06/03/14 09:30
10269379002	**LAO-SS-1-060214**	Water	06/02/14 10:00	06/03/14 09:30
10269379003	**LAO-SS-2-060214**	Water	06/02/14 11:27	06/03/14 09:30

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10269379001	**LAO-SS-1-052914**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10269379002	**LAO-SS-1-060214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10269379003	**LAO-SS-2-060214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 16, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/46395

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10268921001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1699283)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1699284)
  - Calcium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/46395

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1699283)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 16, 2014

Analyte Comments:

QC Batch: MPRP/46395

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1699284)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: June 16, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Sample: LAO-SS-1-052914 **Lab ID: 10269379001** Collected: 05/29/14 11:28 Received: 06/03/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0061J**	mg/L	0.010	0.0012	1	06/05/14 13:05	06/12/14 10:29	7429-90-5	
Arsenic	**0.0048**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 11:17	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	06/05/14 13:05	06/11/14 11:17	7440-43-9	
Calcium	**114**	mg/L	0.40	0.084	10	06/05/14 13:05	06/11/14 11:21	7440-70-2	
Copper	**0.0082**	mg/L	0.0010	0.00022	1	06/05/14 13:05	06/11/14 11:17	7440-50-8	
Iron	**0.018J**	mg/L	0.050	0.0080	1	06/05/14 13:05	06/11/14 11:17	7439-89-6	
Lead	**0.00038**	mg/L	0.00010	0.000046	1	06/05/14 13:05	06/11/14 11:17	7439-92-1	
Magnesium	**30.8**	mg/L	0.10	0.028	10	06/05/14 13:05	06/11/14 11:21	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/05/14 13:05	06/11/14 11:17	7440-22-4	
Total Hardness by 2340B	**413**	mg/L	0.71	0.36	10	06/05/14 13:05	06/11/14 11:21		
Uranium-238	**0.0027**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 11:17	7440-61-1	
Zinc	**0.019**	mg/L	0.0050	0.0025	1	06/05/14 13:05	06/11/14 11:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/05/14 12:57	06/05/14 17:06	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Sample: LAO-SS-1-060214 **Lab ID: 10269379002** Collected: 06/02/14 10:00 Received: 06/03/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.010**	mg/L	0.010	0.0012	1	06/05/14 13:05	06/12/14 10:33	7429-90-5	
Arsenic	**0.0047**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 11:26	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000033	1	06/05/14 13:05	06/11/14 11:26	7440-43-9	
Calcium	**112**	mg/L	0.40	0.084	10	06/05/14 13:05	06/11/14 11:31	7440-70-2	
Copper	**0.010**	mg/L	0.0010	0.00022	1	06/05/14 13:05	06/11/14 11:26	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0080	1	06/05/14 13:05	06/11/14 11:26	7439-89-6	
Lead	**0.00058**	mg/L	0.00010	0.000046	1	06/05/14 13:05	06/11/14 11:26	7439-92-1	
Magnesium	**30.7**	mg/L	0.10	0.028	10	06/05/14 13:05	06/11/14 11:31	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/05/14 13:05	06/11/14 11:26	7440-22-4	
Total Hardness by 2340B	**407**	mg/L	0.71	0.36	10	06/05/14 13:05	06/11/14 11:31		
Uranium-238	**0.0034**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 11:26	7440-61-1	
Zinc	**0.022**	mg/L	0.0050	0.0025	1	06/05/14 13:05	06/11/14 11:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/05/14 12:57	06/05/14 17:08	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Sample: LAO-SS-2-060214 **Lab ID: 10269379003** Collected: 06/02/14 11:27 Received: 06/03/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.065**	mg/L	0.020	0.0023	2	06/05/14 13:05	06/12/14 10:38	7429-90-5	
Arsenic	**0.021**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 11:49	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000033	1	06/05/14 13:05	06/11/14 11:49	7440-43-9	
Calcium	**137**	mg/L	0.40	0.084	10	06/05/14 13:05	06/11/14 11:54	7440-70-2	
Copper	**0.43**	mg/L	0.0010	0.00022	1	06/05/14 13:05	06/11/14 11:49	7440-50-8	
Iron	**2.2**	mg/L	0.050	0.0080	1	06/05/14 13:05	06/11/14 11:49	7439-89-6	
Lead	**0.0033**	mg/L	0.00010	0.000046	1	06/05/14 13:05	06/11/14 11:49	7439-92-1	
Magnesium	**34.2**	mg/L	0.020	0.0057	2	06/05/14 13:05	06/12/14 10:38	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/05/14 13:05	06/11/14 11:49	7440-22-4	
Total Hardness by 2340B	**483**	mg/L	0.71	0.36	10	06/05/14 13:05	06/11/14 11:54		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	06/05/14 13:05	06/11/14 11:49	7440-61-1	
Zinc	**4.7**	mg/L	0.25	0.12	50	06/05/14 13:05	06/11/14 11:58	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/05/14 12:57	06/05/14 17:11	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

QC Batch: MERP/10612 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10269379001, 10269379002, 10269379003

METHOD BLANK: 1699129 | Matrix: Water
Associated Lab Samples: 10269379001, 10269379002, 10269379003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	06/05/14 16:44	

LABORATORY CONTROL SAMPLE: 1699130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699131 1699132

Parameter	Units	10268921003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0050	98	99	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

QC Batch: MPRP/46395 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10269379001, 10269379002, 10269379003

METHOD BLANK: 1699281 Matrix: Water
Associated Lab Samples: 10269379001, 10269379002, 10269379003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	06/11/14 10:07	
Arsenic	mg/L	ND	0.00050	06/11/14 10:07	
Cadmium	mg/L	ND	0.000080	06/11/14 10:07	
Calcium	mg/L	0.013J	0.040	06/11/14 10:07	
Copper	mg/L	ND	0.0010	06/11/14 10:07	
Iron	mg/L	ND	0.050	06/11/14 10:07	
Lead	mg/L	ND	0.00010	06/11/14 10:07	
Magnesium	mg/L	ND	0.010	06/11/14 10:07	
Silver	mg/L	ND	0.00050	06/11/14 10:07	
Uranium-238	mg/L	ND	0.00050	06/11/14 10:07	
Zinc	mg/L	ND	0.0050	06/11/14 10:07	

LABORATORY CONTROL SAMPLE: 1699282

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	107	85-115	
Arsenic	mg/L	.08	0.087	108	85-115	
Cadmium	mg/L	.08	0.089	112	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.088	110	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.087	109	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Silver	mg/L	.08	0.084	104	85-115	
Uranium-238	mg/L	.08	0.085	106	85-115	
Zinc	mg/L	.08	0.089	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699283 1699284

Parameter	Units	10268921001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.054	.08	.08	0.15	0.15	122	122	70-130	.3	20	
Arsenic	mg/L	0.0048	.08	.08	0.091	0.091	107	108	70-130	.7	20	
Cadmium	mg/L	0.00015	.08	.08	0.086	0.087	107	108	70-130	1	20	
Calcium	mg/L	111	1	1	111	111	3	-7	70-130	.09	20	E,M1
Copper	mg/L	0.014	.08	.08	0.098	0.099	106	106	70-130	.4	20	
Iron	mg/L	0.079	1	1	1.2	1.1	112	104	70-130	6	20	
Lead	mg/L	0.0015	.08	.08	0.085	0.085	104	105	70-130	.4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699283 1699284

Parameter	Units	10268921001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	29.4	1	1	30.1	30.1	67	71	70-130	.1	20	M1
Silver	mg/L	0.000065J	.08	.08	0.079	0.080	99	100	70-130	1	20	
Uranium-238	mg/L	0.0023	.08	.08	0.085	0.085	103	104	70-130	.6	20	
Zinc	mg/L	0.040	.08	.08	0.12	0.12	102	102	70-130	.2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10269379

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10269379001	**LAO-SS-1-052914**	EPA 200.8	MPRP/46395	EPA 200.8	ICPM/20376
10269379002	**LAO-SS-1-060214**	EPA 200.8	MPRP/46395	EPA 200.8	ICPM/20376
10269379003	**LAO-SS-2-060214**	EPA 200.8	MPRP/46395	EPA 200.8	ICPM/20376
10269379001	**LAO-SS-1-052914**	EPA 245.1	MERP/10612	EPA 245.1	MERC/12222
10269379002	**LAO-SS-1-060214**	EPA 245.1	MERP/10612	EPA 245.1	MERC/12222
10269379003	**LAO-SS-2-060214**	EPA 245.1	MERP/10612	EPA 245.1	MERC/12222

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
Req Due Date (mm/dd/yy): _____
Rush TAT: Yes ____ No x
BP Facility No: LAO Wetlands (Weekly)
Lab Work Order Number: 10269379

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Lauren Burmiester
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-052914	5/29/14	11:28		X						2			X	X	001
	LAO-SS-1-060214	6/2/14	10:00		X						2			X	X	002
	LAO-SS-2-060214	6/2/14	11:27		X						1			X		003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: C. Kissell, T. Hickey
Sampler's Company: Pioneer Technical Services
Shipment Method: FEDEX Ship Date: 6/2/14
Shipment Tracking No: 552409202070 6

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[illegible] / PTS	6/2/14	12:30	[illegible] PTS	6/3/14	930

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pimpor

Project #: WO# : 10269379

10269379

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5510920207 06

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.5 **Cooler Temp Corrected (°C):** 3.6 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.1 **Date and Initials of Person Examining Contents:** 6/3/14 BO

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. 2/2, 2/2, 2/2 ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1410	Temp: 3.5	Corrected Temp: 3.6
Time: 1418	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 6/4/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

June 19, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on June 10, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10270192001	**LAO-SS-1-060514**	Water	06/05/14 12:00	06/10/14 09:40
10270192002	**LAO-SS-1-060914**	Water	06/09/14 11:15	06/10/14 09:40
10270192003	**LAO-SS-2-060914**	Water	06/09/14 11:57	06/10/14 09:40

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10270192001	**LAO-SS-1-060514**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10270192002	**LAO-SS-1-060914**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10270192003	**LAO-SS-2-060914**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 19, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/46578

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10270192001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1705764)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1705765)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 19, 2014

Analyte Comments:

QC Batch: MPRP/46578

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1705764)
  - Calcium
- MSD (Lab ID: 1705765)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: June 19, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Sample: LAO-SS-1-060514 **Lab ID: 10270192001** Collected: 06/05/14 12:00 Received: 06/10/14 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.048**	mg/L	0.010	0.0012	1	06/13/14 10:45	06/17/14 16:49	7429-90-5	
Arsenic	**0.0056**	mg/L	0.00050	0.00025	1	06/13/14 10:45	06/17/14 16:49	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	06/13/14 10:45	06/17/14 16:49	7440-43-9	
Calcium	**120**	mg/L	0.80	0.17	20	06/13/14 10:45	06/17/14 17:14	7440-70-2	M1
Copper	**0.015**	mg/L	0.0010	0.00022	1	06/13/14 10:45	06/17/14 16:49	7440-50-8	
Iron	**0.076**	mg/L	0.050	0.0080	1	06/13/14 10:45	06/17/14 16:49	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	06/13/14 10:45	06/17/14 16:49	7439-92-1	
Magnesium	**32.6**	mg/L	0.20	0.057	20	06/13/14 10:45	06/17/14 17:14	7439-95-4	M1
Silver	**0.00014J**	mg/L	0.00050	0.000056	1	06/13/14 10:45	06/17/14 16:49	7440-22-4	
Total Hardness by 2340B	**433**	mg/L	1.4	0.71	20	06/13/14 10:45	06/17/14 17:14		
Uranium-238	**0.0036**	mg/L	0.00050	0.00025	1	06/13/14 10:45	06/17/14 16:49	7440-61-1	
Zinc	**0.043**	mg/L	0.0050	0.0025	1	06/13/14 10:45	06/17/14 16:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/16/14 13:03	06/17/14 13:10	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Sample: LAO-SS-1-060914 **Lab ID: 10270192002** Collected: 06/09/14 11:15 Received: 06/10/14 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.020**	mg/L	0.010	0.0012	1	06/13/14 10:45	06/17/14 17:17	7429-90-5	
Arsenic	**0.0057**	mg/L	0.00050	0.00025	1	06/13/14 10:45	06/17/14 17:17	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	06/13/14 10:45	06/17/14 17:17	7440-43-9	
Calcium	**126**	mg/L	0.80	0.17	20	06/13/14 10:45	06/17/14 17:20	7440-70-2	
Copper	**0.012**	mg/L	0.0010	0.00022	1	06/13/14 10:45	06/17/14 17:17	7440-50-8	
Iron	**0.041J**	mg/L	0.050	0.0080	1	06/13/14 10:45	06/17/14 17:17	7439-89-6	
Lead	**0.0010**	mg/L	0.00010	0.000046	1	06/13/14 10:45	06/17/14 17:17	7439-92-1	
Magnesium	**34.1**	mg/L	0.20	0.057	20	06/13/14 10:45	06/17/14 17:20	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/13/14 10:45	06/17/14 17:17	7440-22-4	
Total Hardness by 2340B	**454**	mg/L	1.4	0.71	20	06/13/14 10:45	06/17/14 17:20		
Uranium-238	**0.0037**	mg/L	0.00050	0.00025	1	06/13/14 10:45	06/17/14 17:17	7440-61-1	
Zinc	**0.031**	mg/L	0.0050	0.0025	1	06/13/14 10:45	06/17/14 17:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/16/14 13:03	06/17/14 13:12	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Sample: LAO-SS-2-060914 **Lab ID: 10270192003** Collected: 06/09/14 11:57 Received: 06/10/14 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.074**	mg/L	0.010	0.0012	1	06/13/14 10:45	06/17/14 17:23	7429-90-5	
Arsenic	**0.028**	mg/L	0.00050	0.00025	1	06/13/14 10:45	06/17/14 17:23	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000033	1	06/13/14 10:45	06/17/14 17:23	7440-43-9	
Calcium	**143**	mg/L	0.80	0.17	20	06/13/14 10:45	06/17/14 17:26	7440-70-2	
Copper	**0.47**	mg/L	0.020	0.0043	20	06/13/14 10:45	06/17/14 17:26	7440-50-8	
Iron	**2.6**	mg/L	0.050	0.0080	1	06/13/14 10:45	06/17/14 17:23	7439-89-6	
Lead	**0.0032**	mg/L	0.00010	0.000046	1	06/13/14 10:45	06/17/14 17:23	7439-92-1	
Magnesium	**35.9**	mg/L	0.20	0.057	20	06/13/14 10:45	06/17/14 17:26	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/13/14 10:45	06/17/14 17:23	7440-22-4	
Total Hardness by 2340B	**505**	mg/L	1.4	0.71	20	06/13/14 10:45	06/17/14 17:26		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	06/13/14 10:45	06/17/14 17:23	7440-61-1	
Zinc	**5.0**	mg/L	0.10	0.050	20	06/13/14 10:45	06/17/14 17:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/16/14 13:03	06/17/14 13:14	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

QC Batch: MERP/10700 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10270192001, 10270192002, 10270192003

METHOD BLANK: 1708290 Matrix: Water
Associated Lab Samples: 10270192001, 10270192002, 10270192003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	06/17/14 13:06	

LABORATORY CONTROL SAMPLE: 1708291

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1708292 1708293

Parameter	Units	10270192003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0046	0.0044	92	89	70-130	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

QC Batch: MPRP/46578 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10270192001, 10270192002, 10270192003

METHOD BLANK: 1705762 Matrix: Water
Associated Lab Samples: 10270192001, 10270192002, 10270192003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0019J	0.010	06/17/14 16:43	
Arsenic	mg/L	ND	0.00050	06/17/14 16:43	
Cadmium	mg/L	ND	0.000080	06/17/14 16:43	
Calcium	mg/L	ND	0.040	06/17/14 16:43	
Copper	mg/L	ND	0.0010	06/17/14 16:43	
Iron	mg/L	ND	0.050	06/17/14 16:43	
Lead	mg/L	ND	0.00010	06/17/14 16:43	
Magnesium	mg/L	ND	0.010	06/17/14 16:43	
Silver	mg/L	ND	0.00050	06/17/14 16:43	
Uranium-238	mg/L	ND	0.00050	06/17/14 16:43	
Zinc	mg/L	ND	0.0050	06/17/14 16:43	

LABORATORY CONTROL SAMPLE: 1705763

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.083	103	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.085	106	85-115	
Iron	mg/L	1	1.1	109	85-115	
Lead	mg/L	.08	0.082	102	85-115	
Magnesium	mg/L	1	1.0	104	85-115	
Silver	mg/L	.08	0.084	105	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.086	108	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1705764 1705765

Parameter	Units	10270192001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.048	.08	.08	0.15	0.14	124	116	70-130	5	20	
Arsenic	mg/L	0.0056	.08	.08	0.090	0.088	105	103	70-130	2	20	
Cadmium	mg/L	0.00018	.08	.08	0.085	0.083	105	104	70-130	1	20	
Calcium	mg/L	120	1	1	119	113	-32	-634	70-130	5	20	E,M1
Copper	mg/L	0.015	.08	.08	0.10	0.097	107	103	70-130	3	20	
Iron	mg/L	0.076	1	1	1.2	1.1	112	102	70-130	9	20	
Lead	mg/L	0.0016	.08	.08	0.083	0.080	102	99	70-130	3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1705764 1705765

Parameter	Units	10270192001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.6	1	1	34.9	33.0	224	35	70-130	6	20	M1
Silver	mg/L	0.00014 J	.08	.08	0.083	0.080	103	100	70-130	3	20	
Uranium-238	mg/L	0.0036	.08	.08	0.084	0.082	101	98	70-130	3	20	
Zinc	mg/L	0.043	.08	.08	0.13	0.13	111	107	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10270192

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10270192001	**LAO-SS-1-060514**	EPA 200.8	MPRP/46578	EPA 200.8	ICPM/20452
10270192002	**LAO-SS-1-060914**	EPA 200.8	MPRP/46578	EPA 200.8	ICPM/20452
10270192003	**LAO-SS-2-060914**	EPA 200.8	MPRP/46578	EPA 200.8	ICPM/20452
10270192001	**LAO-SS-1-060514**	EPA 245.1	MERP/10700	EPA 245.1	MERC/12337
10270192002	**LAO-SS-1-060914**	EPA 245.1	MERP/10700	EPA 245.1	MERC/12337
10270192003	**LAO-SS-2-060914**	EPA 245.1	MERP/10700	EPA 245.1	MERC/12337

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10270192

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email.

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-060514	6/5/14	12:00		X						2			X	X	001
	LAO-SS-1-060914	6/9/14	11:15		X						2			X	X	002
	LAO-SS-2-060914	6/9/14	11:57		X						1			X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: D. Renz, T. Hickey						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	1300	6/9/14	KO / Pace	6-10-14	940
Shipment Method: Fed Ex Ship Date: 6/9/14						
Shipment Tracking No: 854092020717						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.4 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer

Project #: WO#: 10270192

10270192

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other: _____

Tracking Number: 5540 9202 0717

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☑ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.4 **Cooler Temp Corrected (°C):** 4.4 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.0 **Date and Initials of Person Examining Contents:** KO 6-10-14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? JT 6/11/14	☐ Yes	☑ No	☐ N/A	11.
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # All
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1357 Temp: 4.4	Corrected Temp:	
Time: 1405 put in cooler		
Time: Temp:	Corrected Temp:	

Project Manager Review: _____ **Date:** 6/11/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 24, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on June 17, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10270965001	**LAO-SS-1-061214**	Water	06/12/14 13:30	06/17/14 09:00
10270965002	**LAO-SS-1-061614**	Water	06/16/14 11:06	06/17/14 09:00
10270965003	**LAO-SS-2-061614**	Water	06/16/14 11:45	06/17/14 09:00
10270965004	**LAO-SS-1T-061614**	Water	06/16/14 11:06	06/17/14 09:00
10270965005	**LAO-SS-4-061614**	Water	06/16/14 11:45	06/17/14 09:00
10270965006	**LAO-SS-3-061614**	Water	06/16/14 11:25	06/17/14 09:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10270965001	**LAO-SS-1-061214**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10270965002	**LAO-SS-1-061614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10270965003	**LAO-SS-2-061614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10270965004	**LAO-SS-1T-061614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10270965005	**LAO-SS-4-061614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10270965006	**LAO-SS-3-061614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 24, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/46699

B: Analyte was detected in the associated method blank.

- BLANK for HBN 302743 [MPRP/466 (Lab ID: 1710522)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/46699

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10270965001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1710524)
  - Magnesium
- MSD (Lab ID: 1710525)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: June 24, 2014

Analyte Comments:

QC Batch: MPRP/46699

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1710524)
  - Calcium
- MSD (Lab ID: 1710525)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: June 24, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: June 24, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: June 24, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: June 24, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/36366

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1710692)
  - Total Suspended Solids

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: June 24, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/18799

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10270965002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1710381)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1710382)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Sample: LAO-SS-1-061214 **Lab ID: 10270965001** Collected: 06/12/14 13:30 Received: 06/17/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.047**	mg/L	0.010	0.0012	1	06/18/14 12:58	06/20/14 11:23	7429-90-5	
Arsenic	**0.0058**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 11:23	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	06/18/14 12:58	06/20/14 11:23	7440-43-9	
Calcium	**120**	mg/L	0.80	0.17	20	06/18/14 12:58	06/20/14 11:34	7440-70-2	M1
Copper	**0.012**	mg/L	0.0010	0.00022	1	06/18/14 12:58	06/20/14 11:23	7440-50-8	
Iron	**0.074**	mg/L	0.050	0.0080	1	06/18/14 12:58	06/20/14 11:23	7439-89-6	
Lead	**0.0017**	mg/L	0.00010	0.000046	1	06/18/14 12:58	06/20/14 11:23	7439-92-1	
Magnesium	**30.8**	mg/L	0.20	0.057	20	06/18/14 12:58	06/20/14 11:34	7439-95-4	M1
Silver	**0.00014J**	mg/L	0.00050	0.000056	1	06/18/14 12:58	06/20/14 11:23	7440-22-4	
Total Hardness by 2340B	**426**	mg/L	1.4	0.71	20	06/18/14 12:58	06/20/14 11:34		
Uranium-238	**0.0033**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 11:23	7440-61-1	
Zinc	**0.034**	mg/L	0.0050	0.0025	1	06/18/14 12:58	06/20/14 11:23	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/20/14 12:29	06/23/14 11:00	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Sample: LAO-SS-1-061614 **Lab ID: 10270965002** Collected: 06/16/14 11:06 Received: 06/17/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.017**	mg/L	0.010	0.0012	1	06/18/14 12:58	06/20/14 11:53	7429-90-5	B
Arsenic	**0.0053**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 11:53	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	06/18/14 12:58	06/20/14 11:53	7440-43-9	
Calcium	**115**	mg/L	0.80	0.17	20	06/18/14 12:58	06/20/14 11:56	7440-70-2	
Copper	**0.0093**	mg/L	0.0010	0.00022	1	06/18/14 12:58	06/20/14 11:53	7440-50-8	
Iron	**0.032J**	mg/L	0.050	0.0080	1	06/18/14 12:58	06/20/14 11:53	7439-89-6	
Lead	**0.00065**	mg/L	0.00010	0.000046	1	06/18/14 12:58	06/20/14 11:53	7439-92-1	
Magnesium	**29.8**	mg/L	0.20	0.057	20	06/18/14 12:58	06/20/14 11:56	7439-95-4	
Silver	**0.00013J**	mg/L	0.00050	0.000056	1	06/18/14 12:58	06/20/14 11:53	7440-22-4	
Total Hardness by 2340B	**410**	mg/L	1.4	0.71	20	06/18/14 12:58	06/20/14 11:56		
Uranium-238	**0.0032**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 11:53	7440-61-1	
Zinc	**0.023**	mg/L	0.0050	0.0025	1	06/18/14 12:58	06/20/14 11:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/20/14 12:29	06/23/14 11:02	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**33.7**	mg/L	5.0	2.5	1		06/19/14 15:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**749**	mg/L	10.0	5.0	1		06/18/14 12:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		06/18/14 11:18		D8
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.52**	mg/L	0.10	0.050	1		06/18/14 12:11		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Sample: LAO-SS-2-061614 **Lab ID: 10270965003** Collected: 06/16/14 11:45 Received: 06/17/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.089**	mg/L	0.010	0.0012	1	06/18/14 12:58	06/20/14 11:59	7429-90-5	
Arsenic	**0.030**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 11:59	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000033	1	06/18/14 12:58	06/20/14 11:59	7440-43-9	
Calcium	**137**	mg/L	0.80	0.17	20	06/18/14 12:58	06/20/14 12:01	7440-70-2	
Copper	**0.46**	mg/L	0.020	0.0043	20	06/18/14 12:58	06/20/14 12:01	7440-50-8	
Iron	**2.8**	mg/L	0.050	0.0080	1	06/18/14 12:58	06/20/14 11:59	7439-89-6	
Lead	**0.0036**	mg/L	0.00010	0.000046	1	06/18/14 12:58	06/20/14 11:59	7439-92-1	
Magnesium	**32.4**	mg/L	0.20	0.057	20	06/18/14 12:58	06/20/14 12:01	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/18/14 12:58	06/20/14 11:59	7440-22-4	
Total Hardness by 2340B	**476**	mg/L	1.4	0.71	20	06/18/14 12:58	06/20/14 12:01		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 11:59	7440-61-1	
Zinc	**4.2**	mg/L	0.10	0.050	20	06/18/14 12:58	06/20/14 12:01	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/20/14 12:29	06/23/14 11:04	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**108**	mg/L	5.0	2.5	1		06/19/14 16:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**827**	mg/L	10.0	5.0	1		06/18/14 12:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**12.0**	mg/L	10.0	5.0	1		06/18/14 11:18		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.47**	mg/L	0.10	0.050	1		06/18/14 12:12		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Sample: LAO-SS-1T-061614 **Lab ID: 10270965004** Collected: 06/16/14 11:06 Received: 06/17/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.086**	mg/L	0.010	0.0012	1	06/18/14 12:58	06/20/14 12:04	7429-90-5	
Arsenic	**0.0058**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 12:04	7440-38-2	
Cadmium	**0.00023**	mg/L	0.000080	0.000033	1	06/18/14 12:58	06/20/14 12:04	7440-43-9	
Calcium	**119**	mg/L	0.80	0.17	20	06/18/14 12:58	06/20/14 12:07	7440-70-2	
Copper	**0.018**	mg/L	0.0010	0.00022	1	06/18/14 12:58	06/20/14 12:04	7440-50-8	
Iron	**0.13**	mg/L	0.050	0.0080	1	06/18/14 12:58	06/20/14 12:04	7439-89-6	
Lead	**0.0025**	mg/L	0.00010	0.000046	1	06/18/14 12:58	06/20/14 12:04	7439-92-1	
Magnesium	**30.0**	mg/L	0.20	0.057	20	06/18/14 12:58	06/20/14 12:07	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/18/14 12:58	06/20/14 12:04	7440-22-4	
Total Hardness by 2340B	**421**	mg/L	1.4	0.71	20	06/18/14 12:58	06/20/14 12:07		
Uranium-238	**0.0032**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 12:04	7440-61-1	
Zinc	**0.052**	mg/L	0.0050	0.0025	1	06/18/14 12:58	06/20/14 12:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/20/14 12:29	06/23/14 11:10	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**33.8**	mg/L	5.0	2.5	1		06/19/14 16:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**757**	mg/L	10.0	5.0	1		06/18/14 12:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**32.0**	mg/L	10.0	5.0	1		06/18/14 11:18		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.60**	mg/L	0.10	0.050	1		06/18/14 12:16		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Sample: LAO-SS-4-061614 **Lab ID: 10270965005** Collected: 06/16/14 11:45 Received: 06/17/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0036J**	mg/L	0.010	0.0012	1	06/18/14 12:58	06/20/14 12:10	7429-90-5	B
Arsenic	ND	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 12:10	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	06/18/14 12:58	06/20/14 12:10	7440-43-9	
Calcium	**0.084**	mg/L	0.040	0.0084	1	06/18/14 12:58	06/20/14 12:10	7440-70-2	
Copper	**0.0011**	mg/L	0.0010	0.00022	1	06/18/14 12:58	06/20/14 12:10	7440-50-8	
Iron	**0.0086J**	mg/L	0.050	0.0080	1	06/18/14 12:58	06/20/14 12:10	7439-89-6	
Lead	**0.000072J**	mg/L	0.00010	0.000046	1	06/18/14 12:58	06/20/14 12:10	7439-92-1	
Magnesium	**0.020**	mg/L	0.010	0.0028	1	06/18/14 12:58	06/20/14 12:10	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/18/14 12:58	06/20/14 12:10	7440-22-4	
Total Hardness by 2340B	**0.29**	mg/L	0.071	0.036	1	06/18/14 12:58	06/20/14 12:10		
Uranium-238	ND	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 12:10	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	06/18/14 12:58	06/20/14 12:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/20/14 12:29	06/23/14 11:12	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**3.2J**	mg/L	5.0	2.5	1		06/19/14 16:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8.0J**	mg/L	10.0	5.0	1		06/18/14 12:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		06/18/14 11:18		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/18/14 12:16		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Sample: LAO-SS-3-061614 **Lab ID: 10270965006** Collected: 06/16/14 11:25 Received: 06/17/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.49**	mg/L	0.010	0.0012	1	06/18/14 12:58	06/20/14 12:26	7429-90-5	
Arsenic	**0.0049**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 12:26	7440-38-2	
Cadmium	**0.033**	mg/L	0.000080	0.000033	1	06/18/14 12:58	06/20/14 12:26	7440-43-9	
Calcium	**116**	mg/L	0.80	0.17	20	06/18/14 12:58	06/20/14 12:29	7440-70-2	
Copper	**1.9**	mg/L	0.020	0.0043	20	06/18/14 12:58	06/20/14 12:29	7440-50-8	
Iron	**10.8**	mg/L	0.050	0.0080	1	06/18/14 12:58	06/20/14 12:26	7439-89-6	
Lead	**0.0030**	mg/L	0.00010	0.000046	1	06/18/14 12:58	06/20/14 12:26	7439-92-1	
Magnesium	**29.4**	mg/L	0.20	0.057	20	06/18/14 12:58	06/20/14 12:29	7439-95-4	
Silver	**0.000086J**	mg/L	0.00050	0.000056	1	06/18/14 12:58	06/20/14 12:26	7440-22-4	
Total Hardness by 2340B	**410**	mg/L	1.4	0.71	20	06/18/14 12:58	06/20/14 12:29		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	06/18/14 12:58	06/20/14 13:48	7440-61-1	
Zinc	**6.3**	mg/L	0.10	0.050	20	06/18/14 12:58	06/20/14 12:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/20/14 12:29	06/23/14 11:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**74.8**	mg/L	5.0	2.5	1		06/19/14 16:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**741**	mg/L	10.0	5.0	1		06/18/14 12:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**28.0**	mg/L	10.0	5.0	1		06/18/14 11:18		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		06/18/14 12:17		

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(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

QC Batch: MERP/10751 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10270965001, 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

METHOD BLANK: 1712037 Matrix: Water
Associated Lab Samples: 10270965001, 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	06/23/14 10:51	

LABORATORY CONTROL SAMPLE: 1712038

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0043	86	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1712039 1712040

Parameter	Units	10270965006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0047	98	94	70-130	4	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

QC Batch: MPRP/46699 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10270965001, 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

METHOD BLANK: 1710522 Matrix: Water
Associated Lab Samples: 10270965001, 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0020J	0.010	06/20/14 11:17	
Arsenic	mg/L	ND	0.00050	06/20/14 11:17	
Cadmium	mg/L	ND	0.000080	06/20/14 11:17	
Calcium	mg/L	ND	0.040	06/20/14 11:17	
Copper	mg/L	ND	0.0010	06/20/14 11:17	
Iron	mg/L	ND	0.050	06/20/14 11:17	
Lead	mg/L	ND	0.00010	06/20/14 11:17	
Magnesium	mg/L	ND	0.010	06/20/14 11:17	
Silver	mg/L	ND	0.00050	06/20/14 11:17	
Uranium-238	mg/L	ND	0.00050	06/20/14 11:17	
Zinc	mg/L	ND	0.0050	06/20/14 11:17	

LABORATORY CONTROL SAMPLE: 1710523

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.082	102	85-115	
Arsenic	mg/L	.08	0.083	104	85-115	
Cadmium	mg/L	.08	0.085	106	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Iron	mg/L	1	1.1	107	85-115	
Lead	mg/L	.08	0.086	107	85-115	
Magnesium	mg/L	1	1.0	104	85-115	
Silver	mg/L	.08	0.092	115	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.081	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1710524 1710525

Parameter	Units	10270965001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.047	.08	.08	0.14	0.14	114	118	70-130	2	20	
Arsenic	mg/L	0.0058	.08	.08	0.090	0.089	106	104	70-130	1	20	
Cadmium	mg/L	0.00018	.08	.08	0.084	0.082	104	103	70-130	1	20	
Calcium	mg/L	120	1	1	121	120	80	18	70-130	.5	20	E,M1
Copper	mg/L	0.012	.08	.08	0.089	0.088	96	95	70-130	1	20	
Iron	mg/L	0.074	1	1	1.2	1.1	108	107	70-130	.6	20	
Lead	mg/L	0.0017	.08	.08	0.083	0.081	101	99	70-130	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1710524 1710525

Parameter	Units	10270965001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	30.8	1	1	31.2	31.1	43	34	70-130	.3	20	M1
Silver	mg/L	0.00014 J	.08	.08	0.081	0.081	101	101	70-130	.7	20	
Uranium-238	mg/L	0.0033	.08	.08	0.090	0.090	109	108	70-130	.4	20	
Zinc	mg/L	0.034	.08	.08	0.11	0.11	98	99	70-130	.3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

QC Batch: WET/36391 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

METHOD BLANK: 1711724 — Matrix: Water
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	06/20/14 08:24	

LABORATORY CONTROL SAMPLE & LCSD: 1711725 1711726

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.5	41.7	104	104	90-110	.4	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1711727 1711728

Parameter	Units	10271106001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	76.8	40	40	116	115	98	96	80-120	.6	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1711729 1711730

Parameter	Units	10270965003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	108	40	40	147	148	98	102	80-120	1	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

QC Batch: WET/36365 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

METHOD BLANK: 1710685 Matrix: Water
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	06/18/14 12:00	

LABORATORY CONTROL SAMPLE: 1710686

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 1710687

Parameter	Units	10270965002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	749	750	.1	10	

SAMPLE DUPLICATE: 1710688

Parameter	Units	10271000003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	763	765	.3	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

QC Batch: WET/36366 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

METHOD BLANK: 1710689 | Matrix: Water
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	06/18/14 11:18	

LABORATORY CONTROL SAMPLE: 1710690

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	96.0	96	80-120	

SAMPLE DUPLICATE: 1710692

Parameter	Units	10270965002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	8.0J		10	D8

SAMPLE DUPLICATE: 1710693

Parameter	Units	10271000003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	128	125	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

QC Batch: WETA/18799 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

METHOD BLANK: 1710379 | Matrix: Water
Associated Lab Samples: 10270965002, 10270965003, 10270965004, 10270965005, 10270965006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	06/18/14 12:02	

LABORATORY CONTROL SAMPLE: 1710380

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.7	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1710381 1710382

Parameter	Units	10270965002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.52	2.5	2.5	1.4	1.3	36	32	80-120	6	30	M1

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QUALIFIERS

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Monthly)
Pace Project No.: 10270965

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10270965001	**LAO-SS-1-061214**	EPA 200.8	MPRP/46699	EPA 200.8	ICPM/20510
10270965002	**LAO-SS-1-061614**	EPA 200.8	MPRP/46699	EPA 200.8	ICPM/20510
10270965003	**LAO-SS-2-061614**	EPA 200.8	MPRP/46699	EPA 200.8	ICPM/20510
10270965004	**LAO-SS-1T-061614**	EPA 200.8	MPRP/46699	EPA 200.8	ICPM/20510
10270965005	**LAO-SS-4-061614**	EPA 200.8	MPRP/46699	EPA 200.8	ICPM/20510
10270965006	**LAO-SS-3-061614**	EPA 200.8	MPRP/46699	EPA 200.8	ICPM/20510
10270965001	**LAO-SS-1-061214**	EPA 245.1	MERP/10751	EPA 245.1	MERC/12386
10270965002	**LAO-SS-1-061614**	EPA 245.1	MERP/10751	EPA 245.1	MERC/12386
10270965003	**LAO-SS-2-061614**	EPA 245.1	MERP/10751	EPA 245.1	MERC/12386
10270965004	**LAO-SS-1T-061614**	EPA 245.1	MERP/10751	EPA 245.1	MERC/12386
10270965005	**LAO-SS-4-061614**	EPA 245.1	MERP/10751	EPA 245.1	MERC/12386
10270965006	**LAO-SS-3-061614**	EPA 245.1	MERP/10751	EPA 245.1	MERC/12386
10270965002	**LAO-SS-1-061614**	SM 2320B	WET/36391		
10270965003	**LAO-SS-2-061614**	SM 2320B	WET/36391		
10270965004	**LAO-SS-1T-061614**	SM 2320B	WET/36391		
10270965005	**LAO-SS-4-061614**	SM 2320B	WET/36391		
10270965006	**LAO-SS-3-061614**	SM 2320B	WET/36391		
10270965002	**LAO-SS-1-061614**	SM 2540C	WET/36365		
10270965003	**LAO-SS-2-061614**	SM 2540C	WET/36365		
10270965004	**LAO-SS-1T-061614**	SM 2540C	WET/36365		
10270965005	**LAO-SS-4-061614**	SM 2540C	WET/36365		
10270965006	**LAO-SS-3-061614**	SM 2540C	WET/36365		
10270965002	**LAO-SS-1-061614**	SM 2540D	WET/36366		
10270965003	**LAO-SS-2-061614**	SM 2540D	WET/36366		
10270965004	**LAO-SS-1T-061614**	SM 2540D	WET/36366		
10270965005	**LAO-SS-4-061614**	SM 2540D	WET/36366		
10270965006	**LAO-SS-3-061614**	SM 2540D	WET/36366		
10270965002	**LAO-SS-1-061614**	SM 4500-NO3 H	WETA/18799		
10270965003	**LAO-SS-2-061614**	SM 4500-NO3 H	WETA/18799		
10270965004	**LAO-SS-1T-061614**	SM 4500-NO3 H	WETA/18799		
10270965005	**LAO-SS-4-061614**	SM 4500-NO3 H	WETA/18799		
10270965006	**LAO-SS-3-061614**	SM 4500-NO3 H	WETA/18799		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands ~~(Weekly)~~ Monthly

Lab Work Order Number: 10270965

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate + Nitrite	TDS, TSS, Alkalinity					Comments
	LAO-SS-1 - 061214	6/12/14	1330		X			2			2				X			X								10270965 001
	LAO-SS-1 - 061614	6/16/14	1106		X			4	1	1	2				X			X	X	X						002
	LAO-SS-2 - 061614	6/16/14	1145		X			3	1	1	1				X				X	X						003
	LAO-SS-1T-061614	6/16/14	1106		X			3	1	1	1				X				X	X						004
	LAO-SS-4-061614	6/16/14	1145		X			3	1	1	1				X				X	X						005
	LAO-SS-3-061614	6/16/14	1125		X			3	1	1	1				X				X	X						006

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: D. Renz, T. Hiatt	[signature] / PTS	6/16/14	1230	[signature] / Pace	6/17/14	9 00
Sampler's Company: Pioneer Technical Services						
Shipment Method: FedEx Ship Date: 6/16/14						
Shipment Tracking No: 5540 9202 0728						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP-PioneerTech

Project #: WO#: 10270965

10270965

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0728

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.8 **Cooler Temp Corrected (°C):** 3.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** TRUE **Date and Initials of Person Examining Contents:** CMB 6/17/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☒ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? 6/17/14 (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1-6 818 515
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1050	Temp: 3.8	Corrected Temp: 3.8
Time: 1055	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 6/17/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

July 02, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on June 24, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10271825001	**LAO-SS-1-061914**	Water	06/19/14 14:30	06/24/14 10:10
10271825002	**LAO-SS-1-062314**	Water	06/23/14 11:30	06/24/14 10:10
10271825003	**LAO-SS-2-062314**	Water	06/23/14 11:45	06/24/14 10:10

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10271825001	**LAO-SS-1-061914**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10271825002	**LAO-SS-1-062314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10271825003	**LAO-SS-2-062314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: July 02, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/46964

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10271825001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1719421)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1719422)
  - Calcium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/46964

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1719421)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: July 02, 2014

Analyte Comments:

QC Batch: MPRP/46964

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1719422)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: July 02, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Sample: LAO-SS-1-061914 **Lab ID: 10271825001** Collected: 06/19/14 14:30 Received: 06/24/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.041**	mg/L	0.010	0.0012	1	06/27/14 09:13	06/27/14 20:05	7429-90-5	
Arsenic	**0.0053**	mg/L	0.00050	0.00025	1	06/27/14 09:13	06/27/14 20:05	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	06/27/14 09:13	06/27/14 20:05	7440-43-9	
Calcium	**111**	mg/L	0.20	0.042	5	06/27/14 09:13	06/27/14 20:30	7440-70-2	M1
Copper	**0.015**	mg/L	0.0010	0.00022	1	06/27/14 09:13	06/27/14 20:05	7440-50-8	
Iron	**0.065**	mg/L	0.050	0.0080	1	06/27/14 09:13	06/27/14 20:05	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	06/27/14 09:13	06/27/14 20:05	7439-92-1	
Magnesium	**30.3**	mg/L	0.050	0.014	5	06/27/14 09:13	06/27/14 20:30	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	06/27/14 09:13	06/27/14 20:05	7440-22-4	
Total Hardness by 2340B	**402**	mg/L	0.36	0.18	5	06/27/14 09:13	06/27/14 20:30		
Uranium-238	**0.0030**	mg/L	0.00050	0.00025	1	06/27/14 09:13	06/27/14 20:05	7440-61-1	
Zinc	**0.039**	mg/L	0.0050	0.0025	1	06/27/14 09:13	06/27/14 20:05	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/27/14 08:45	07/01/14 11:01	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Sample: LAO-SS-1-062314 **Lab ID: 10271825002** Collected: 06/23/14 11:30 Received: 06/24/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.015**	mg/L	0.010	0.0012	1	06/27/14 09:13	06/27/14 20:56	7429-90-5	
Arsenic	**0.0047**	mg/L	0.00050	0.00025	1	06/27/14 09:13	06/27/14 20:56	7440-38-2	
Cadmium	**0.00011**	mg/L	0.000080	0.000033	1	06/27/14 09:13	06/27/14 20:56	7440-43-9	
Calcium	**103**	mg/L	0.40	0.084	10	06/27/14 09:13	06/27/14 21:00	7440-70-2	
Copper	**0.0092**	mg/L	0.0010	0.00022	1	06/27/14 09:13	06/27/14 20:56	7440-50-8	
Iron	**0.041J**	mg/L	0.050	0.0080	1	06/27/14 09:13	06/27/14 20:56	7439-89-6	
Lead	**0.00057**	mg/L	0.00010	0.000046	1	06/27/14 09:13	06/27/14 20:56	7439-92-1	
Magnesium	**28.4**	mg/L	0.10	0.028	10	06/27/14 09:13	06/27/14 21:00	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/27/14 09:13	06/27/14 20:56	7440-22-4	
Total Hardness by 2340B	**373**	mg/L	0.71	0.36	10	06/27/14 09:13	06/27/14 21:00		
Uranium-238	**0.0030**	mg/L	0.00050	0.00025	1	06/27/14 09:13	06/27/14 20:56	7440-61-1	
Zinc	**0.026**	mg/L	0.0050	0.0025	1	06/27/14 09:13	06/27/14 20:56	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/27/14 08:45	07/01/14 11:03	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Sample: LAO-SS-2-062314 **Lab ID: 10271825003** Collected: 06/23/14 11:45 Received: 06/24/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.038**	mg/L	0.010	0.0012	1	06/27/14 09:13	06/27/14 21:05	7429-90-5	
Arsenic	**0.016**	mg/L	0.00050	0.00025	1	06/27/14 09:13	06/27/14 21:05	7440-38-2	
Cadmium	**0.016**	mg/L	0.000080	0.000033	1	06/27/14 09:13	06/27/14 21:05	7440-43-9	
Calcium	**125**	mg/L	0.40	0.084	10	06/27/14 09:13	06/27/14 21:09	7440-70-2	
Copper	**0.33**	mg/L	0.0010	0.00022	1	06/27/14 09:13	06/27/14 21:05	7440-50-8	
Iron	**1.6**	mg/L	0.050	0.0080	1	06/27/14 09:13	06/27/14 21:05	7439-89-6	
Lead	**0.0018**	mg/L	0.00010	0.000046	1	06/27/14 09:13	06/27/14 21:05	7439-92-1	
Magnesium	**32.1**	mg/L	0.10	0.028	10	06/27/14 09:13	06/27/14 21:09	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	06/27/14 09:13	06/27/14 21:05	7440-22-4	
Total Hardness by 2340B	**443**	mg/L	0.71	0.36	10	06/27/14 09:13	06/27/14 21:09		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	06/27/14 09:13	06/27/14 21:05	7440-61-1	
Zinc	**4.4**	mg/L	0.050	0.025	10	06/27/14 09:13	06/27/14 21:09	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	06/27/14 08:45	07/01/14 11:06	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

QC Batch: MERP/10832 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10271825001, 10271825002, 10271825003

METHOD BLANK: 1717544 Matrix: Water
Associated Lab Samples: 10271825001, 10271825002, 10271825003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	07/01/14 10:56	

LABORATORY CONTROL SAMPLE: 1717545

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1717546 1717547

Parameter	Units	10271825003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0051	102	102	70-130	.8	20	

MATRIX SPIKE SAMPLE: 1717548

Parameter	Units	10271925076 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0053	105	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

QC Batch: MPRP/46964 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10271825001, 10271825002, 10271825003

METHOD BLANK: 1718311 Matrix: Water
Associated Lab Samples: 10271825001, 10271825002, 10271825003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0016J	0.010	06/27/14 19:56	
Arsenic	mg/L	ND	0.00050	06/27/14 19:56	
Cadmium	mg/L	ND	0.000080	06/27/14 19:56	
Calcium	mg/L	ND	0.040	06/27/14 19:56	
Copper	mg/L	ND	0.0010	06/27/14 19:56	
Iron	mg/L	0.0098J	0.050	06/27/14 19:56	
Lead	mg/L	ND	0.00010	06/27/14 19:56	
Magnesium	mg/L	ND	0.010	06/27/14 19:56	
Silver	mg/L	ND	0.00050	06/27/14 19:56	
Uranium-238	mg/L	ND	0.00050	06/27/14 19:56	
Zinc	mg/L	ND	0.0050	06/27/14 19:56	

LABORATORY CONTROL SAMPLE: 1718312

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.082	102	85-115	
Cadmium	mg/L	.08	0.082	102	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.079	99	85-115	
Iron	mg/L	1	1.0	104	85-115	
Lead	mg/L	.08	0.083	103	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.081	101	85-115	
Uranium-238	mg/L	.08	0.083	103	85-115	
Zinc	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1719421 1719422

Parameter	Units	10271825001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.041	.08	.08	0.14	0.14	121	123	70-130	1	20	
Arsenic	mg/L	0.0053	.08	.08	0.089	0.091	105	107	70-130	2	20	
Cadmium	mg/L	0.00015	.08	.08	0.081	0.082	101	103	70-130	1	20	
Calcium	mg/L	111	1	1	111	114	8	316	70-130	3	20	E,M1
Copper	mg/L	0.015	.08	.08	0.091	0.092	95	97	70-130	2	20	
Iron	mg/L	0.065	1	1	1.1	1.1	105	105	70-130	.4	20	
Lead	mg/L	0.0016	.08	.08	0.083	0.084	101	103	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1719421 1719422

Parameter	Units	10271825001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	30.3	1	1	30.5	31.2	28	92	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.079	0.080	99	100	70-130	1	20	
Uranium-238	mg/L	0.0030	.08	.08	0.083	0.085	100	102	70-130	2	20	
Zinc	mg/L	0.039	.08	.08	0.12	0.12	100	105	70-130	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10271825

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10271825001	**LAO-SS-1-061914**	EPA 200.8	MPRP/46964	EPA 200.8	ICPM/20621
10271825002	**LAO-SS-1-062314**	EPA 200.8	MPRP/46964	EPA 200.8	ICPM/20621
10271825003	**LAO-SS-2-062314**	EPA 200.8	MPRP/46964	EPA 200.8	ICPM/20621
10271825001	**LAO-SS-1-061914**	EPA 245.1	MERP/10832	EPA 245.1	MERC/12486
10271825002	**LAO-SS-1-062314**	EPA 245.1	MERP/10832	EPA 245.1	MERC/12486
10271825003	**LAO-SS-2-062314**	EPA 245.1	MERP/10832	EPA 245.1	MERC/12486

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Laboratory Management Program LaMP Chain of Custody Record

bp rm

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10271825

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 -061914	6/19/14	1430		X						2				X	X	10271825 001
	LAO-SS-1 -062314	6/23/14	1130		X						2				X	X	002
	LAO-SS-2 -062314	6/23/14	1145		X						1				X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Steve Lubick, DJ Renz						
Sampler's Company: Pioneer Technical Services	Steve Lubick / PTS	6/23/14	1330	EDK Pace	6/24/14	1010
Shipment Method: Fed Ex Ship Date: 6/23/14						
Shipment Tracking No: 554092020739						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.4 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10271825

10271825

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0739

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.4 **Cooler Temp Corrected (°C):** 2.4 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** DJL 6/24/14

Comments:

Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☐ Yes	☒ No	☐ N/A	12. 2nd Sample Inst says LAO-SS-1 Ver: field by date and time
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 3/2 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1-2 3 4
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 16:17 Temp: 2.4	Corrected Temp:
Time: 16:20 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 6/26/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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August 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on July 01, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This is a revised report to reflect re-calculated hardness results.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee for
Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10272778001	**LAO-SS-1-062614**	Water	06/26/14 11:30	07/01/14 10:00
10272778002	**LAO-SS-1-063014**	Water	06/30/14 11:10	07/01/14 10:00
10272778003	**LAO-SS-2-063014**	Water	06/30/14 13:10	07/01/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10272778001	**LAO-SS-1-062614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10272778002	**LAO-SS-1-063014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10272778003	**LAO-SS-2-063014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/47130

B: Analyte was detected in the associated method blank.

- BLANK for HBN 305568 [MPRP/471 (Lab ID: 1724310)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/47130

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10272778001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1724312)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1724313)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 28, 2014

Analyte Comments:

QC Batch: MPRP/47130

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1724312)
  - Calcium
- MSD (Lab ID: 1724313)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Sample: LAO-SS-1-062614 **Lab ID: 10272778001** Collected: 06/26/14 11:30 Received: 07/01/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.013**	mg/L	0.010	0.0012	1	07/05/14 16:58	07/10/14 20:40	7429-90-5	B
Arsenic	**0.0049**	mg/L	0.00050	0.00025	1	07/05/14 16:58	07/10/14 20:40	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	07/05/14 16:58	07/10/14 20:40	7440-43-9	
Calcium	**105**	mg/L	0.20	0.042	5	07/05/14 16:58	07/10/14 21:05	7440-70-2	M1
Copper	**0.0085**	mg/L	0.0010	0.00022	1	07/05/14 16:58	07/10/14 20:40	7440-50-8	
Iron	**0.033J**	mg/L	0.050	0.0080	1	07/05/14 16:58	07/10/14 20:40	7439-89-6	
Lead	**0.00059**	mg/L	0.00010	0.000046	1	07/05/14 16:58	07/10/14 20:40	7439-92-1	
Magnesium	**27.1**	mg/L	0.050	0.014	5	07/05/14 16:58	07/10/14 21:05	7439-95-4	M1
Silver	**0.000085J**	mg/L	0.00050	0.000056	1	07/05/14 16:58	07/10/14 20:40	7440-22-4	
Total Hardness by 2340B	**374**	mg/L	0.36	0.18	5	07/05/14 16:58	07/10/14 21:05		
Uranium-238	**0.0025**	mg/L	0.00050	0.00025	1	07/05/14 16:58	07/10/14 20:40	7440-61-1	
Zinc	**0.026**	mg/L	0.0050	0.0025	1	07/05/14 16:58	07/10/14 20:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/08/14 16:15	07/10/14 11:07	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Sample: LAO-SS-1-063014 **Lab ID: 10272778002** Collected: 06/30/14 11:10 Received: 07/01/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.017**	mg/L	0.010	0.0012	1	07/05/14 16:58	07/10/14 21:25	7429-90-5	B
Arsenic	**0.0051**	mg/L	0.00050	0.00025	1	07/05/14 16:58	07/10/14 21:25	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	07/05/14 16:58	07/10/14 21:25	7440-43-9	
Calcium	**106**	mg/L	0.40	0.084	10	07/05/14 16:58	07/10/14 21:29	7440-70-2	
Copper	**0.010**	mg/L	0.0010	0.00022	1	07/05/14 16:58	07/10/14 21:25	7440-50-8	
Iron	**0.037J**	mg/L	0.050	0.0080	1	07/05/14 16:58	07/10/14 21:25	7439-89-6	
Lead	**0.00090**	mg/L	0.00010	0.000046	1	07/05/14 16:58	07/10/14 21:25	7439-92-1	
Magnesium	**26.9**	mg/L	0.10	0.028	10	07/05/14 16:58	07/10/14 21:29	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	07/05/14 16:58	07/10/14 21:25	7440-22-4	
Total Hardness by 2340B	**375**	mg/L	0.71	0.36	10	07/05/14 16:58	07/10/14 21:29		
Uranium-238	**0.0018**	mg/L	0.00050	0.00025	1	07/05/14 16:58	07/10/14 21:25	7440-61-1	
Zinc	**0.027**	mg/L	0.0050	0.0025	1	07/05/14 16:58	07/10/14 21:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/08/14 16:15	07/10/14 11:10	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Sample: LAO-SS-2-063014 **Lab ID: 10272778003** Collected: 06/30/14 13:10 Received: 07/01/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.16**	mg/L	0.010	0.0012	1	07/05/14 16:58	07/10/14 21:34	7429-90-5	
Arsenic	**0.042**	mg/L	0.00050	0.00025	1	07/05/14 16:58	07/10/14 21:34	7440-38-2	
Cadmium	**0.019**	mg/L	0.000080	0.000033	1	07/05/14 16:58	07/10/14 21:34	7440-43-9	
Calcium	**135**	mg/L	0.80	0.17	20	07/05/14 16:58	07/10/14 21:39	7440-70-2	
Copper	**0.72**	mg/L	0.020	0.0043	20	07/05/14 16:58	07/10/14 21:39	7440-50-8	
Iron	**4.1**	mg/L	0.050	0.0080	1	07/05/14 16:58	07/10/14 21:34	7439-89-6	
Lead	**0.0070**	mg/L	0.00010	0.000046	1	07/05/14 16:58	07/10/14 21:34	7439-92-1	
Magnesium	**32.6**	mg/L	0.20	0.057	20	07/05/14 16:58	07/10/14 21:39	7439-95-4	
Silver	**0.000070J**	mg/L	0.00050	0.000056	1	07/05/14 16:58	07/10/14 21:34	7440-22-4	
Total Hardness by 2340B	**471**	mg/L	1.4	0.71	20	07/05/14 16:58	07/10/14 21:39		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	07/05/14 16:58	07/10/14 21:34	7440-61-1	
Zinc	**5.0**	mg/L	0.10	0.050	20	07/05/14 16:58	07/10/14 21:39	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/08/14 16:15	07/10/14 11:12	7439-97-6	

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(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

QC Batch: MERP/10934 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10272778001, 10272778002, 10272778003

METHOD BLANK: 1725260 | Matrix: Water
Associated Lab Samples: 10272778001, 10272778002, 10272778003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	07/10/14 11:02	

LABORATORY CONTROL SAMPLE: 1725261

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1725262 1725263

Parameter	Units	10272778003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0055	0.0053	109	106	70-130	3	20	

MATRIX SPIKE SAMPLE: 1725264

Parameter	Units	10272877136 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.00034	.005	0.0057	108	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

QC Batch: MPRP/47130 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10272778001, 10272778002, 10272778003

METHOD BLANK: 1724310 Matrix: Water
Associated Lab Samples: 10272778001, 10272778002, 10272778003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0021J	0.010	07/10/14 20:25	
Arsenic	mg/L	ND	0.00050	07/10/14 20:25	
Cadmium	mg/L	ND	0.000080	07/10/14 20:25	
Calcium	mg/L	0.011J	0.040	07/10/14 20:25	
Copper	mg/L	ND	0.0010	07/10/14 20:25	
Iron	mg/L	ND	0.050	07/10/14 20:25	
Lead	mg/L	ND	0.00010	07/10/14 20:25	
Magnesium	mg/L	ND	0.010	07/10/14 20:25	
Silver	mg/L	ND	0.00050	07/10/14 20:25	
Uranium-238	mg/L	ND	0.00050	07/10/14 20:25	
Zinc	mg/L	ND	0.0050	07/10/14 20:25	

LABORATORY CONTROL SAMPLE: 1724311

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.078	98	85-115	
Arsenic	mg/L	.08	0.081	102	85-115	
Cadmium	mg/L	.08	0.080	100	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.078	97	85-115	
Iron	mg/L	1	1.0	101	85-115	
Lead	mg/L	.08	0.082	103	85-115	
Magnesium	mg/L	1	1.0	100	85-115	
Silver	mg/L	.08	0.082	103	85-115	
Uranium-238	mg/L	.08	0.081	102	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1724312 1724313

Parameter	Units	10272778001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.013	.08	.08	0.091	0.089	97	95	70-130	2	20	
Arsenic	mg/L	0.0049	.08	.08	0.086	0.087	102	103	70-130	1	20	
Cadmium	mg/L	0.00014	.08	.08	0.078	0.080	97	100	70-130	3	20	
Calcium	mg/L	105	1	1	104	103	-80	-186	70-130	1	20	E,M1
Copper	mg/L	0.0085	.08	.08	0.083	0.085	93	95	70-130	2	20	
Iron	mg/L	0.033J	1	1	1.0	1.0	99	99	70-130	0	20	
Lead	mg/L	0.00059	.08	.08	0.082	0.083	102	103	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1724312 1724313

Parameter	Units	10272778001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	27.1	1	1	27.6	27.0	48	-12	70-130	2	20	M1
Silver	mg/L	0.000085J	.08	.08	0.079	0.080	99	100	70-130	1	20	
Uranium-238	mg/L	0.0025	.08	.08	0.083	0.084	101	102	70-130	1	20	
Zinc	mg/L	0.026	.08	.08	0.10	0.10	97	97	70-130	0	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10272778

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10272778001	**LAO-SS-1-062614**	EPA 200.8	MPRP/47130	EPA 200.8	ICPM/20769
10272778002	**LAO-SS-1-063014**	EPA 200.8	MPRP/47130	EPA 200.8	ICPM/20769
10272778003	**LAO-SS-2-063014**	EPA 200.8	MPRP/47130	EPA 200.8	ICPM/20769
10272778001	**LAO-SS-1-062614**	EPA 245.1	MERP/10934	EPA 245.1	MERC/12626
10272778002	**LAO-SS-1-063014**	EPA 245.1	MERP/10934	EPA 245.1	MERC/12626
10272778003	**LAO-SS-2-063014**	EPA 245.1	MERP/10934	EPA 245.1	MERC/12626

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** _____

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-062614	6/26/14	11:30		X			2			2				X	X	001
	LAO-SS-1-063014	6/30/14	11:10		X			2			2				X	X	002
	LAO-SS-2-063014	6/30/14	1310		X			1			1				X		003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Slubick, T. Hickey						
Sampler's Company: Pioneer Technical Services	Thomas Hickey / PTS	6/30/14	14:00	KO / Pace	7-1-14	1000
Shipment Method: Fed Ex Ship Date: 6/30/14						
Shipment Tracking No: 5540 9202 0853						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (No) | Temp Blank: Yes / No (No) | Cooler Temp on Receipt: 5.9 °F/C | Trip Blank: Yes / No (No) | MS/MSD Sample Submitted: Yes / No (No)

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer Tech **Project #:** WO#: 10272778 10272778

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other: _____

Tracking Number: 5540 9202 0853

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other: bags **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.9 **Cooler Temp Corrected (°C):** 5.9 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** _____ **Date and Initials of Person Examining Contents:** _____

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 2.2 1-1 #1-2 #3
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 5:25pm Temp: 5.9	Corrected Temp:
Time: 5:35pm put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 7/8/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

August 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on July 08, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This is a revised report to reflect re-calculated hardness results.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee for
Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10273240001	**LAO-SS-1-070314**	Water	07/03/14 14:30	07/08/14 10:00
10273240002	**LAO-SS-1-070714**	Water	07/07/14 10:20	07/08/14 10:00
10273240003	**LAO-SS-2-070714**	Water	07/07/14 11:15	07/08/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10273240001	**LAO-SS-1-070314**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10273240002	**LAO-SS-1-070714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10273240003	**LAO-SS-2-070714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/47317

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10273240001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1729821)
  - Aluminum
  - Calcium
  - Magnesium
- MSD (Lab ID: 1729822)
  - Aluminum
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Sample: LAO-SS-1-070314 **Lab ID: 10273240001** Collected: 07/03/14 14:30 Received: 07/08/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.098**	mg/L	0.010	0.0012	1	07/10/14 19:03	07/14/14 16:09	7429-90-5	M1
Arsenic	**0.0057**	mg/L	0.00050	0.00025	1	07/10/14 19:03	07/14/14 16:09	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	07/10/14 19:03	07/14/14 16:09	7440-43-9	
Calcium	**94.1**	mg/L	0.80	0.17	20	07/10/14 19:03	07/14/14 16:37	7440-70-2	M1
Copper	**0.019**	mg/L	0.0010	0.00022	1	07/10/14 19:03	07/14/14 16:09	7440-50-8	
Iron	**0.14**	mg/L	0.050	0.0080	1	07/10/14 19:03	07/14/14 16:09	7439-89-6	
Lead	**0.0029**	mg/L	0.00010	0.000046	1	07/10/14 19:03	07/14/14 16:09	7439-92-1	
Magnesium	**24.2**	mg/L	0.20	0.057	20	07/10/14 19:03	07/14/14 16:37	7439-95-4	M1
Silver	**0.00018J**	mg/L	0.00050	0.000056	1	07/10/14 19:03	07/14/14 16:09	7440-22-4	
Total Hardness by 2340B	**334**	mg/L	1.4	0.71	20	07/10/14 19:03	07/14/14 16:37		
Uranium-238	**0.0017**	mg/L	0.00050	0.00025	1	07/10/14 19:03	07/14/14 16:09	7440-61-1	
Zinc	**0.054**	mg/L	0.0050	0.0025	1	07/10/14 19:03	07/14/14 16:09	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/11/14 13:28	07/13/14 16:45	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Sample: LAO-SS-1-070714 **Lab ID: 10273240002** Collected: 07/07/14 10:20 Received: 07/08/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.037**	mg/L	0.010	0.0012	1	07/10/14 19:03	07/14/14 16:20	7429-90-5	
Arsenic	**0.0052**	mg/L	0.00050	0.00025	1	07/10/14 19:03	07/14/14 16:20	7440-38-2	
Cadmium	**0.00019**	mg/L	0.000080	0.000033	1	07/10/14 19:03	07/14/14 16:20	7440-43-9	
Calcium	**111**	mg/L	0.80	0.17	20	07/10/14 19:03	07/14/14 16:23	7440-70-2	
Copper	**0.014**	mg/L	0.0010	0.00022	1	07/10/14 19:03	07/14/14 16:20	7440-50-8	
Iron	**0.063**	mg/L	0.050	0.0080	1	07/10/14 19:03	07/14/14 16:20	7439-89-6	
Lead	**0.0015**	mg/L	0.00010	0.000046	1	07/10/14 19:03	07/14/14 16:20	7439-92-1	
Magnesium	**27.8**	mg/L	0.20	0.057	20	07/10/14 19:03	07/14/14 16:23	7439-95-4	
Silver	**0.00015J**	mg/L	0.00050	0.000056	1	07/10/14 19:03	07/14/14 16:20	7440-22-4	
Total Hardness by 2340B	**392**	mg/L	1.4	0.71	20	07/10/14 19:03	07/14/14 16:23		
Uranium-238	**0.0013**	mg/L	0.00050	0.00025	1	07/10/14 19:03	07/14/14 16:20	7440-61-1	
Zinc	**0.036**	mg/L	0.0050	0.0025	1	07/10/14 19:03	07/14/14 16:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/11/14 13:28	07/13/14 16:47	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Sample: LAO-SS-2-070714 **Lab ID: 10273240003** Collected: 07/07/14 11:15 Received: 07/08/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.049**	mg/L	0.010	0.0012	1	07/10/14 19:03	07/14/14 16:31	7429-90-5	
Arsenic	**0.023**	mg/L	0.00050	0.00025	1	07/10/14 19:03	07/14/14 16:31	7440-38-2	
Cadmium	**0.014**	mg/L	0.000080	0.000033	1	07/10/14 19:03	07/14/14 16:31	7440-43-9	
Calcium	**124**	mg/L	0.80	0.17	20	07/10/14 19:03	07/14/14 16:34	7440-70-2	
Copper	**0.37**	mg/L	0.0010	0.00022	1	07/10/14 19:03	07/14/14 16:31	7440-50-8	
Iron	**1.8**	mg/L	0.050	0.0080	1	07/10/14 19:03	07/14/14 16:31	7439-89-6	
Lead	**0.0023**	mg/L	0.00010	0.000046	1	07/10/14 19:03	07/14/14 16:31	7439-92-1	
Magnesium	**31.9**	mg/L	0.20	0.057	20	07/10/14 19:03	07/14/14 16:34	7439-95-4	
Silver	**0.000067J**	mg/L	0.00050	0.000056	1	07/10/14 19:03	07/14/14 16:31	7440-22-4	
Total Hardness by 2340B	**442**	mg/L	1.4	0.71	20	07/10/14 19:03	07/14/14 16:34		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	07/10/14 19:03	07/14/14 16:31	7440-61-1	
Zinc	**3.8**	mg/L	0.10	0.050	20	07/10/14 19:03	07/14/14 16:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/11/14 13:28	07/13/14 16:50	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

QC Batch: MERP/10990 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10273240001, 10273240002, 10273240003

METHOD BLANK: 1729855 Matrix: Water
Associated Lab Samples: 10273240001, 10273240002, 10273240003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	07/13/14 16:41	

LABORATORY CONTROL SAMPLE: 1729856

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0056	112	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1729857 1729858

Parameter	Units	10273240003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0054	0.0054	108	107	70-130	1	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

QC Batch: MPRP/47317 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10273240001, 10273240002, 10273240003

METHOD BLANK: 1729819 Matrix: Water
Associated Lab Samples: 10273240001, 10273240002, 10273240003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0020J	0.010	07/14/14 16:00	
Arsenic	mg/L	ND	0.00050	07/14/14 16:00	
Cadmium	mg/L	ND	0.000080	07/14/14 16:00	
Calcium	mg/L	ND	0.040	07/14/14 16:00	
Copper	mg/L	ND	0.0010	07/14/14 16:00	
Iron	mg/L	ND	0.050	07/14/14 16:00	
Lead	mg/L	ND	0.00010	07/14/14 16:00	
Magnesium	mg/L	ND	0.010	07/14/14 16:00	
Silver	mg/L	ND	0.00050	07/14/14 16:00	
Uranium-238	mg/L	ND	0.00050	07/14/14 16:00	
Zinc	mg/L	ND	0.0050	07/14/14 16:00	

LABORATORY CONTROL SAMPLE: 1729820

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.078	97	85-115	
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.084	105	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.082	102	85-115	
Iron	mg/L	1	1.0	102	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.0	100	85-115	
Silver	mg/L	.08	0.082	103	85-115	
Uranium-238	mg/L	.08	0.082	102	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1729821 1729822

Parameter	Units	10273240001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.098	.08	.08	0.21	0.21	137	145	70-130	3	20	M1
Arsenic	mg/L	0.0057	.08	.08	0.088	0.092	102	108	70-130	5	20	
Cadmium	mg/L	0.00020	.08	.08	0.083	0.087	104	109	70-130	5	20	
Calcium	mg/L	94.1	1	1	106	112	1171	1819	70-130	6	20	M1
Copper	mg/L	0.019	.08	.08	0.10	0.11	103	111	70-130	7	20	
Iron	mg/L	0.14	1	1	1.2	1.3	107	116	70-130	7	20	
Lead	mg/L	0.0029	.08	.08	0.082	0.088	99	106	70-130	7	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1729821 1729822

Parameter	Units	10273240001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	24.2	1	1	28.6	30.6	446	648	70-130	7	20	M1
Silver	mg/L	0.00018J	.08	.08	0.078	0.083	98	103	70-130	6	20	
Uranium-238	mg/L	0.0017	.08	.08	0.080	0.088	98	107	70-130	9	20	
Zinc	mg/L	0.054	.08	.08	0.14	0.15	106	117	70-130	6	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10273240

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10273240001	**LAO-SS-1-070314**	EPA 200.8	MPRP/47317	EPA 200.8	ICPM/20866
10273240002	**LAO-SS-1-070714**	EPA 200.8	MPRP/47317	EPA 200.8	ICPM/20866
10273240003	**LAO-SS-2-070714**	EPA 200.8	MPRP/47317	EPA 200.8	ICPM/20866
10273240001	**LAO-SS-1-070314**	EPA 245.1	MERP/10990	EPA 245.1	MERC/12657
10273240002	**LAO-SS-1-070714**	EPA 245.1	MERP/10990	EPA 245.1	MERC/12657
10273240003	**LAO-SS-2-070714**	EPA 245.1	MERP/10990	EPA 245.1	MERC/12657

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Laboratory Management Program LaMP Chain of Custody Record 1160

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10273240

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	LAO-SS-1-070314	7/3/14	1430		X						2				X	X	10273240 001
	LAO-SS-1-070714	7/7/14	1020		X						2				X	X	002
	LAO-SS-2-070714	7/7/14	1115		X						1				X		003

Sampler's Name: D. Renz, T. Hickey	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	Thomas Hickey / PTS	7/7/14	13:00	[illegible]	7/8/14	1000
Shipment Method: FedEx Ship Date: 7/7/14						
Shipment Tracking No: 554092018496						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 5.6 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer tech

Project #: WO# : 10273240

10273240

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5590 9201 8496

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☒ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.6 **Cooler Temp Corrected (°C):** 5.6 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.0 **Date and Initials of Person Examining Contents:** 7/8/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # SS-1 2/2 SS-1 1/1 SS-2 2/2
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1200	Temp: 5.6	Corrected Temp: 5.6
Time: 1208	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 7/9/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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1700 Elm Street - Suite 200
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August 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10273983

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on July 15, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This is a revised report to reflect re-calculated hardness results.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee for
Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10273983

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10273983

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10273983001	**LAO-SS-1-071014**	Water	07/10/14 11:00	07/15/14 09:45
10273983002	**LAO-SS-1-071414**	Water	07/14/14 10:15	07/15/14 09:45
10273983003	**LAO-SS-2-071414**	Water	07/14/14 11:25	07/15/14 09:45
10273983004	**LAO-SS-2T-071414**	Water	07/14/14 11:25	07/15/14 09:45
10273983005	**LAO-SS-3-071414**	Water	07/14/14 10:35	07/15/14 09:45
10273983006	**LAO-SS-4-071414**	Water	07/14/14 11:40	07/15/14 09:45

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10273983

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10273983001	**LAO-SS-1-071014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
10273983002	**LAO-SS-1-071414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10273983003	**LAO-SS-2-071414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10273983004	**LAO-SS-2T-071414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10273983005	**LAO-SS-3-071414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10273983006	**LAO-SS-4-071414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	BT	1	PASI-M
		SM 2320B	PH1	4	PASI-M
		SM 2540C	AAD	1	PASI-M
		SM 2540D	AAD	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/47422

B: Analyte was detected in the associated method blank.

- BLANK for HBN 307505 [MPRP/474 (Lab ID: 1733392)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/47422

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10273983001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1733394)
  - Aluminum
  - Calcium
  - Magnesium
- MSD (Lab ID: 1733395)
  - Aluminum
  - Calcium
  - Magnesium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 28, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/47422

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1733394)
  - Calcium
- MSD (Lab ID: 1733395)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10273983

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/19256

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10273438001,10273983003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1734563)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1734565)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1734564)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1734566)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10273983

Sample: LAO-SS-1-071014 **Lab ID: 10273983001** Collected: 07/10/14 11:00 Received: 07/15/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.058**	mg/L	0.010	0.0012	1	07/16/14 11:21	07/21/14 18:36	7429-90-5	M1
Arsenic	**0.0059**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:36	7440-38-2	
Cadmium	**0.00011**	mg/L	0.000080	0.000033	1	07/16/14 11:21	07/21/14 18:36	7440-43-9	
Calcium	**129**	mg/L	0.80	0.17	20	07/16/14 11:21	07/21/14 18:44	7440-70-2	M1
Copper	**0.012**	mg/L	0.0010	0.00022	1	07/16/14 11:21	07/21/14 18:36	7440-50-8	
Iron	**0.066**	mg/L	0.050	0.0080	1	07/16/14 11:21	07/21/14 18:36	7439-89-6	
Lead	**0.0014**	mg/L	0.00010	0.000046	1	07/16/14 11:21	07/21/14 18:36	7439-92-1	
Magnesium	**32.3**	mg/L	0.20	0.057	20	07/16/14 11:21	07/21/14 18:44	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	07/16/14 11:21	07/21/14 18:36	7440-22-4	
Total Hardness by 2340B	**454**	mg/L	1.4	0.71	20	07/16/14 11:21	07/21/14 18:44		
Uranium-238	**0.0014**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:36	7440-61-1	
Zinc	**0.024**	mg/L	0.0050	0.0025	1	07/16/14 11:21	07/21/14 18:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/16/14 13:44	07/17/14 10:52	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10273983

Sample: LAO-SS-1-071414 **Lab ID: 10273983002** Collected: 07/14/14 10:15 Received: 07/15/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.098**	mg/L	0.010	0.0012	1	07/16/14 11:21	07/21/14 17:59	7429-90-5	
Arsenic	**0.0063**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 17:59	7440-38-2	
Cadmium	**0.00022**	mg/L	0.000080	0.000033	1	07/16/14 11:21	07/21/14 17:59	7440-43-9	
Calcium	**123**	mg/L	0.80	0.17	20	07/16/14 11:21	07/21/14 18:02	7440-70-2	
Copper	**0.020**	mg/L	0.0010	0.00022	1	07/16/14 11:21	07/21/14 17:59	7440-50-8	
Iron	**0.14**	mg/L	0.050	0.0080	1	07/16/14 11:21	07/21/14 17:59	7439-89-6	
Lead	**0.0024**	mg/L	0.00010	0.000046	1	07/16/14 11:21	07/21/14 17:59	7439-92-1	
Magnesium	**30.3**	mg/L	0.20	0.057	20	07/16/14 11:21	07/21/14 18:02	7439-95-4	
Silver	**0.00022J**	mg/L	0.00050	0.000056	1	07/16/14 11:21	07/21/14 17:59	7440-22-4	
Total Hardness by 2340B	**431**	mg/L	1.4	0.71	20	07/16/14 11:21	07/21/14 18:02		
Uranium-238	**0.0014**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 17:59	7440-61-1	
Zinc	**0.062**	mg/L	0.0050	0.0025	1	07/16/14 11:21	07/21/14 17:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/16/14 13:44	07/17/14 10:54	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:08		
Alkalinity, Total as CaCO3	**29.2**	mg/L	5.0	2.5	1		07/22/14 13:08		
Alkalinity,Bicarbonate (CaCO3)	**19.5**	mg/L	5.0	2.5	1		07/22/14 13:08		
Alkalinity,Carbonate (CaCO3)	**9.7**	mg/L	5.0	2.5	1		07/22/14 13:08		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**715**	mg/L	10.0	5.0	1		07/16/14 15:10		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		07/16/14 13:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.34**	mg/L	0.10	0.050	1		07/17/14 17:46		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10273983

Sample: LAO-SS-2-071414 **Lab ID: 10273983003** Collected: 07/14/14 11:25 Received: 07/15/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.045**	mg/L	0.010	0.0012	1	07/16/14 11:21	07/21/14 18:05	7429-90-5	
Arsenic	**0.024**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:05	7440-38-2	
Cadmium	**0.015**	mg/L	0.000080	0.000033	1	07/16/14 11:21	07/21/14 18:05	7440-43-9	
Calcium	**149**	mg/L	0.80	0.17	20	07/16/14 11:21	07/21/14 18:08	7440-70-2	
Copper	**0.38**	mg/L	0.0010	0.00022	1	07/16/14 11:21	07/21/14 18:05	7440-50-8	
Iron	**1.8**	mg/L	0.050	0.0080	1	07/16/14 11:21	07/21/14 18:05	7439-89-6	
Lead	**0.0020**	mg/L	0.00010	0.000046	1	07/16/14 11:21	07/21/14 18:05	7439-92-1	
Magnesium	**36.7**	mg/L	0.20	0.057	20	07/16/14 11:21	07/21/14 18:08	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	07/16/14 11:21	07/21/14 18:05	7440-22-4	
Total Hardness by 2340B	**524**	mg/L	1.4	0.71	20	07/16/14 11:21	07/21/14 18:08		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:05	7440-61-1	
Zinc	**4.4**	mg/L	0.10	0.050	20	07/16/14 11:21	07/21/14 18:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/16/14 13:44	07/17/14 11:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:25		
Alkalinity, Total as CaCO3	**106**	mg/L	5.0	2.5	1		07/22/14 13:25		
Alkalinity,Bicarbonate (CaCO3)	**106**	mg/L	5.0	2.5	1		07/22/14 13:25		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**806**	mg/L	10.0	5.0	1		07/16/14 15:10		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**8.0J**	mg/L	10.0	5.0	1		07/16/14 13:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.68**	mg/L	0.10	0.050	1		07/17/14 17:50		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10273983

Sample: LAO-SS-2T-071414 **Lab ID: 10273983004** Collected: 07/14/14 11:25 Received: 07/15/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.047**	mg/L	0.010	0.0012	1	07/16/14 11:21	07/21/14 18:11	7429-90-5	
Arsenic	**0.024**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:11	7440-38-2	
Cadmium	**0.016**	mg/L	0.000080	0.000033	1	07/16/14 11:21	07/21/14 18:11	7440-43-9	
Calcium	**138**	mg/L	0.80	0.17	20	07/16/14 11:21	07/21/14 18:13	7440-70-2	
Copper	**0.38**	mg/L	0.0010	0.00022	1	07/16/14 11:21	07/21/14 18:11	7440-50-8	
Iron	**1.9**	mg/L	0.050	0.0080	1	07/16/14 11:21	07/21/14 18:11	7439-89-6	
Lead	**0.0021**	mg/L	0.00010	0.000046	1	07/16/14 11:21	07/21/14 18:11	7439-92-1	
Magnesium	**34.0**	mg/L	0.20	0.057	20	07/16/14 11:21	07/21/14 18:13	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	07/16/14 11:21	07/21/14 18:11	7440-22-4	
Total Hardness by 2340B	**484**	mg/L	1.4	0.71	20	07/16/14 11:21	07/21/14 18:13		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:11	7440-61-1	
Zinc	**4.1**	mg/L	0.10	0.050	20	07/16/14 11:21	07/21/14 18:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/16/14 13:44	07/17/14 11:09	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:38		
Alkalinity, Total as CaCO3	**105**	mg/L	5.0	2.5	1		07/22/14 13:38		
Alkalinity,Bicarbonate (CaCO3)	**105**	mg/L	5.0	2.5	1		07/22/14 13:38		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**805**	mg/L	10.0	5.0	1		07/16/14 15:10		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**7.0J**	mg/L	10.0	5.0	1		07/16/14 13:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.61**	mg/L	0.10	0.050	1		07/17/14 17:55		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10273983

Sample: LAO-SS-3-071414 **Lab ID: 10273983005** Collected: 07/14/14 10:35 Received: 07/15/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.41**	mg/L	0.010	0.0012	1	07/16/14 11:21	07/21/14 18:16	7429-90-5	
Arsenic	**0.0041**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:16	7440-38-2	
Cadmium	**0.037**	mg/L	0.000080	0.000033	1	07/16/14 11:21	07/21/14 18:16	7440-43-9	
Calcium	**149**	mg/L	0.80	0.17	20	07/16/14 11:21	07/21/14 18:19	7440-70-2	
Copper	**2.2**	mg/L	0.020	0.0043	20	07/16/14 11:21	07/21/14 18:19	7440-50-8	
Iron	**11.3**	mg/L	0.050	0.0080	1	07/16/14 11:21	07/21/14 18:16	7439-89-6	
Lead	**0.0021**	mg/L	0.00010	0.000046	1	07/16/14 11:21	07/21/14 18:16	7439-92-1	
Magnesium	**36.6**	mg/L	0.20	0.057	20	07/16/14 11:21	07/21/14 18:19	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	07/16/14 11:21	07/21/14 18:16	7440-22-4	
Total Hardness by 2340B	**522**	mg/L	1.4	0.71	20	07/16/14 11:21	07/21/14 18:19		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:16	7440-61-1	
Zinc	**7.5**	mg/L	0.10	0.050	20	07/16/14 11:21	07/21/14 18:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/16/14 13:44	07/17/14 11:12	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:42		
Alkalinity, Total as CaCO3	**74.0**	mg/L	5.0	2.5	1		07/22/14 13:42		
Alkalinity,Bicarbonate (CaCO3)	**74.0**	mg/L	5.0	2.5	1		07/22/14 13:42		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 13:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**868**	mg/L	10.0	5.0	1		07/16/14 15:10		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**21.0**	mg/L	10.0	5.0	1		07/16/14 13:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.6**	mg/L	0.10	0.050	1		07/17/14 17:55		

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10273983

Sample: LAO-SS-4-071414 **Lab ID: 10273983006** Collected: 07/14/14 11:40 Received: 07/15/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0037J**	mg/L	0.010	0.0012	1	07/16/14 11:21	07/21/14 18:30	7429-90-5	B
Arsenic	ND	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:30	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	07/16/14 11:21	07/21/14 18:30	7440-43-9	
Calcium	**0.068**	mg/L	0.040	0.0084	1	07/16/14 11:21	07/21/14 18:30	7440-70-2	
Copper	**0.0027**	mg/L	0.0010	0.00022	1	07/16/14 11:21	07/21/14 18:30	7440-50-8	
Iron	**0.0086J**	mg/L	0.050	0.0080	1	07/16/14 11:21	07/21/14 18:30	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	07/16/14 11:21	07/21/14 18:30	7439-92-1	
Magnesium	**0.018**	mg/L	0.010	0.0028	1	07/16/14 11:21	07/21/14 18:30	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	07/16/14 11:21	07/21/14 18:30	7440-22-4	
Total Hardness by 2340B	**0.24**	mg/L	0.071	0.036	1	07/16/14 11:21	07/21/14 18:30		
Uranium-238	ND	mg/L	0.00050	0.00025	1	07/16/14 11:21	07/21/14 18:30	7440-61-1	
Zinc	**0.0045J**	mg/L	0.0050	0.0025	1	07/16/14 11:21	07/21/14 18:30	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/16/14 13:44	07/17/14 11:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 14:43		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		07/22/14 14:43		
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 14:43		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		07/22/14 14:43		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**44.0**	mg/L	10.0	5.0	1		07/16/14 15:10		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		07/16/14 13:00		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		07/17/14 17:56		

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

QC Batch: MERP/11023 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10273983001, 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

METHOD BLANK: 1733408 Matrix: Water
Associated Lab Samples: 10273983001, 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	07/17/14 10:47	

LABORATORY CONTROL SAMPLE: 1733409

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0053	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1733410 1733411

Parameter	Units	10273983002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0051	101	102	70-130	1	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

QC Batch: MPRP/47422 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10273983001, 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

METHOD BLANK: 1733392 | Matrix: Water
Associated Lab Samples: 10273983001, 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0018J	0.010	07/21/14 17:54	
Arsenic	mg/L	ND	0.00050	07/21/14 17:54	
Cadmium	mg/L	ND	0.000080	07/21/14 17:54	
Calcium	mg/L	ND	0.040	07/21/14 17:54	
Copper	mg/L	ND	0.0010	07/21/14 17:54	
Iron	mg/L	ND	0.050	07/21/14 17:54	
Lead	mg/L	ND	0.00010	07/21/14 17:54	
Magnesium	mg/L	ND	0.010	07/21/14 17:54	
Silver	mg/L	ND	0.00050	07/21/14 17:54	
Uranium-238	mg/L	ND	0.00050	07/21/14 17:54	
Zinc	mg/L	ND	0.0050	07/21/14 17:54	

LABORATORY CONTROL SAMPLE: 1733393

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	106	85-115	
Arsenic	mg/L	.08	0.080	101	85-115	
Cadmium	mg/L	.08	0.079	98	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.0	103	85-115	
Lead	mg/L	.08	0.079	99	85-115	
Magnesium	mg/L	1	1.0	100	85-115	
Silver	mg/L	.08	0.085	106	85-115	
Uranium-238	mg/L	.08	0.079	98	85-115	
Zinc	mg/L	.08	0.081	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1733394 1733395

Parameter	Units	10273983001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.058	.08	.08	0.17	0.17	134	138	70-130	2	20	M1
Arsenic	mg/L	0.0059	.08	.08	0.090	0.090	105	105	70-130	0	20	
Cadmium	mg/L	0.00011	.08	.08	0.079	0.079	98	98	70-130	0	20	
Calcium	mg/L	129	1	1	126	124	-296	-414	70-130	1	20	E,M1
Copper	mg/L	0.012	.08	.08	0.095	0.095	105	105	70-130	0	20	
Iron	mg/L	0.066	1	1	1.1	1.2	108	109	70-130	1	20	
Lead	mg/L	0.0014	.08	.08	0.079	0.079	97	97	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1733394 1733395

Parameter	Units	10273983001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.3	1	1	30.7	30.7	-158	-159	70-130	0	20	M1
Silver	mg/L	ND	.08	.08	0.079	0.078	99	97	70-130	1	20	
Uranium-238	mg/L	0.0014	.08	.08	0.079	0.080	97	98	70-130	1	20	
Zinc	mg/L	0.024	.08	.08	0.11	0.11	103	103	70-130	1	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

QC Batch: WET/36974 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

METHOD BLANK: 1735222 Matrix: Water
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Hydroxide (CaCO3)	mg/L	ND	5.0	07/22/14 10:50	
Alkalinity, Total as CaCO3	mg/L	ND	5.0	07/22/14 10:50	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	07/22/14 10:50	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	07/22/14 10:50	

LABORATORY CONTROL SAMPLE & LCSD: 1735223 1735224

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.9	41.9	105	105	90-110	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1735225 1735226

Parameter	Units	10273813001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	474000 ug/L	40	40	510	510	89	89	80-120	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1735227 1735228

Parameter	Units	10273983003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	106	40	40	146	148	99	105	80-120	1	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

QC Batch: WET/36946 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

METHOD BLANK: 1733782 | Matrix: Water
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	07/16/14 15:10	

LABORATORY CONTROL SAMPLE: 1733783

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	984	98	80-120	

SAMPLE DUPLICATE: 1733784

Parameter	Units	10273813001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1110000 ug/L	1160	4	10	

SAMPLE DUPLICATE: 1733785

Parameter	Units	10273883005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1670	1660	0	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

QC Batch: WET/36942 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

METHOD BLANK: 1733598 | Matrix: Water
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	07/16/14 13:00	

LABORATORY CONTROL SAMPLE: 1733599

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	92.0	92	80-120	

SAMPLE DUPLICATE: 1733600

Parameter	Units	10273883009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1733601

Parameter	Units	10273983006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10273983

QC Batch: WETA/19256 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

METHOD BLANK: 1734561 | Matrix: Water
Associated Lab Samples: 10273983002, 10273983003, 10273983004, 10273983005, 10273983006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	07/17/14 17:22	

LABORATORY CONTROL SAMPLE: 1734562

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1734563 1734564

Parameter	Units	10273438001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1160 ug/L	2.5	2.5	1.4	1.5	10	14	80-120	6	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1734565 1734566

Parameter	Units	10273983003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.68	2.5	2.5	1.6	1.5	35	34	80-120	2	30	M1

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10273983

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10273983

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10273983001	**LAO-SS-1-071014**	EPA 200.8	MPRP/47422	EPA 200.8	ICPM/20938
10273983002	**LAO-SS-1-071414**	EPA 200.8	MPRP/47422	EPA 200.8	ICPM/20938
10273983003	**LAO-SS-2-071414**	EPA 200.8	MPRP/47422	EPA 200.8	ICPM/20938
10273983004	**LAO-SS-2T-071414**	EPA 200.8	MPRP/47422	EPA 200.8	ICPM/20938
10273983005	**LAO-SS-3-071414**	EPA 200.8	MPRP/47422	EPA 200.8	ICPM/20938
10273983006	**LAO-SS-4-071414**	EPA 200.8	MPRP/47422	EPA 200.8	ICPM/20938
10273983001	**LAO-SS-1-071014**	EPA 245.1	MERP/11023	EPA 245.1	MERC/12694
10273983002	**LAO-SS-1-071414**	EPA 245.1	MERP/11023	EPA 245.1	MERC/12694
10273983003	**LAO-SS-2-071414**	EPA 245.1	MERP/11023	EPA 245.1	MERC/12694
10273983004	**LAO-SS-2T-071414**	EPA 245.1	MERP/11023	EPA 245.1	MERC/12694
10273983005	**LAO-SS-3-071414**	EPA 245.1	MERP/11023	EPA 245.1	MERC/12694
10273983006	**LAO-SS-4-071414**	EPA 245.1	MERP/11023	EPA 245.1	MERC/12694
10273983002	**LAO-SS-1-071414**	SM 2320B	WET/36974		
10273983003	**LAO-SS-2-071414**	SM 2320B	WET/36974		
10273983004	**LAO-SS-2T-071414**	SM 2320B	WET/36974		
10273983005	**LAO-SS-3-071414**	SM 2320B	WET/36974		
10273983006	**LAO-SS-4-071414**	SM 2320B	WET/36974		
10273983002	**LAO-SS-1-071414**	SM 2540C	WET/36946		
10273983003	**LAO-SS-2-071414**	SM 2540C	WET/36946		
10273983004	**LAO-SS-2T-071414**	SM 2540C	WET/36946		
10273983005	**LAO-SS-3-071414**	SM 2540C	WET/36946		
10273983006	**LAO-SS-4-071414**	SM 2540C	WET/36946		
10273983002	**LAO-SS-1-071414**	SM 2540D	WET/36942		
10273983003	**LAO-SS-2-071414**	SM 2540D	WET/36942		
10273983004	**LAO-SS-2T-071414**	SM 2540D	WET/36942		
10273983005	**LAO-SS-3-071414**	SM 2540D	WET/36942		
10273983006	**LAO-SS-4-071414**	SM 2540D	WET/36942		
10273983002	**LAO-SS-1-071414**	SM 4500-NO3 H	WETA/19256		
10273983003	**LAO-SS-2-071414**	SM 4500-NO3 H	WETA/19256		
10273983004	**LAO-SS-2T-071414**	SM 4500-NO3 H	WETA/19256		
10273983005	**LAO-SS-3-071414**	SM 4500-NO3 H	WETA/19256		
10273983006	**LAO-SS-4-071414**	SM 4500-NO3 H	WETA/19256		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

SHORT HOLD 7/15/14 Page 1 of 1

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 1027 3983

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate + Nitrite	TDS/TSS/Alkalinity					Comments
	LAO-SS-1 - 071014	7/10/14	1100		x						2				x			x							1027 3983 001
	LAO-SS-1 - 071414	7/14/14	1015		x			4	1	1	2				x			x	x	x					002
	LAO-SS-2 - 071414	7/14/14	1125		x			3	1	1	1				x				x	x					003
	LAO-SS-2T-071414	7/14/14	1125		x			3	1	1	1				x				x	x					004
	LAO-SS-3-071414	7/14/14	1035		x			3	1	1	1				x				x	x					005
	LAO-SS-4-071414	7/14/14	1140		x			3	1	1	1				x				x	x					006

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ Benz, T. Hickey						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	7/14/14	1230	[signature] Pace	7/15/14	945
Shipment Method: FedEx Ship Date: 7/14/14						
Shipment Tracking No: 5540 9201 8485						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.9 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 09May2014 Page 1 of 1
	Document No.: F-MN-L-210-rev.12	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer Tech

Project #: WO#: 10273983

10273983

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] SpeeDee [ ] Other:

Tracking Number: 554092018485

Custody Seal on Cooler/Box Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Optional: Proj. Due Date: Proj. Name:

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [X] None [ ] Other: **Temp Blank?** [X] Yes [ ] No

Thermom. Used: [ ] B88A9130516413 [ ] B88A912167504 [X] B88A9132521491 **Type of Ice:** [X] Wet [ ] Blue [ ] None [ ] Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.9 **Cooler Temp Corrected (°C):** 2.9 **Biological Tissue Frozen?** [ ] Yes [ ] No [X] NA

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** ERL 7/15/14

				Comments:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Chain of Custody Filled Out?	[X] Yes	[ ] No	[ ] N/A	2.
Chain of Custody Relinquished?	[X] Yes	[ ] No	[ ] N/A	3.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	4.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	5.
Short Hold Time Analysis (<72 hr)?	[X] Yes	[ ] No	[ ] N/A	6.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	[ ] Yes	[ ] No	[X] N/A	8.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	9.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	10.
Filtered Volume Received for Dissolved Tests?	[X] Yes	[ ] No	[ ] N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	[X] Yes	[ ] No	[ ] N/A	12.
All containers needing acid/base preservation have been checked?	[X] Yes	[ ] No	[ ] N/A	13. 3-6 1/1 [X] HNO_3 [X] H_2SO_4 1/1 [ ] NaOH [ ] HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	[X] Yes	[ ] No	[ ] N/A	Sample # 1-2 2/2 2-6 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	[ ] Yes	[ ] No	[X] N/A	14.
3 Trip Blanks Present?	[ ] Yes	[ ] No	[X] N/A	15.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 1350 Temp:	Corrected Temp: 2.9
Time: 1350 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 7/15/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

September 05, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on July 22, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This is a revised report correcting hardness calculation errors.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee for
Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10274756001	**LAO-SS-1-071714**	Water	07/17/14 11:25	07/22/14 09:45
10274756002	**LAO-SS-1-072114**	Water	07/21/14 09:50	07/22/14 09:45
10274756003	**LAO-SS-2-072114**	Water	07/21/14 10:56	07/22/14 09:45

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10274756001	**LAO-SS-1-071714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10274756002	**LAO-SS-1-072114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10274756003	**LAO-SS-2-072114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 05, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/47636

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10274756001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1740952)
  - Aluminum
  - Calcium
  - Magnesium
- MSD (Lab ID: 1740953)
  - Aluminum
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 05, 2014

Analyte Comments:

QC Batch: MPRP/47636

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1740952)
  - Calcium
- MSD (Lab ID: 1740953)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 05, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Sample: LAO-SS-1-071714 **Lab ID: 10274756001** Collected: 07/17/14 11:25 Received: 07/22/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.11**	mg/L	0.010	0.0012	1	07/24/14 09:13	07/24/14 19:00	7429-90-5	M1
Arsenic	**0.0064**	mg/L	0.00050	0.00025	1	07/24/14 09:13	07/24/14 19:00	7440-38-2	
Cadmium	**0.00024**	mg/L	0.000080	0.000033	1	07/24/14 09:13	07/24/14 19:00	7440-43-9	
Calcium	**130**	mg/L	0.80	0.17	20	07/24/14 09:13	07/24/14 19:08	7440-70-2	M1
Copper	**0.018**	mg/L	0.0010	0.00022	1	07/24/14 09:13	07/24/14 19:00	7440-50-8	
Iron	**0.15**	mg/L	0.050	0.0080	1	07/24/14 09:13	07/24/14 19:00	7439-89-6	
Lead	**0.0027**	mg/L	0.00010	0.000046	1	07/24/14 09:13	07/24/14 19:00	7439-92-1	
Magnesium	**31.7**	mg/L	0.20	0.057	20	07/24/14 09:13	07/24/14 19:08	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	07/24/14 09:13	07/25/14 08:37	7440-22-4	
Total Hardness by 2340B	**454**	mg/L	1.4	0.71	20	07/24/14 09:13	07/24/14 19:08		
Uranium-238	**0.0012**	mg/L	0.00050	0.00025	1	07/24/14 09:13	07/24/14 19:00	7440-61-1	
Zinc	**0.062**	mg/L	0.0050	0.0025	1	07/24/14 09:13	07/24/14 19:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.00010J**	mg/L	0.00020	0.000026	1	07/25/14 11:31	07/29/14 15:22	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Sample: LAO-SS-1-072114 **Lab ID: 10274756002** Collected: 07/21/14 09:50 Received: 07/22/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.11**	mg/L	0.010	0.0012	1	07/24/14 09:13	07/24/14 19:28	7429-90-5	
Arsenic	**0.0066**	mg/L	0.00050	0.00025	1	07/24/14 09:13	07/24/14 19:28	7440-38-2	
Cadmium	**0.00026**	mg/L	0.000080	0.000033	1	07/24/14 09:13	07/24/14 19:28	7440-43-9	
Calcium	**129**	mg/L	0.80	0.17	20	07/24/14 09:13	07/24/14 19:30	7440-70-2	
Copper	**0.021**	mg/L	0.0010	0.00022	1	07/24/14 09:13	07/24/14 19:28	7440-50-8	
Iron	**0.16**	mg/L	0.050	0.0080	1	07/24/14 09:13	07/24/14 19:28	7439-89-6	
Lead	**0.0028**	mg/L	0.00010	0.000046	1	07/24/14 09:13	07/24/14 19:28	7439-92-1	
Magnesium	**32.5**	mg/L	0.20	0.057	20	07/24/14 09:13	07/24/14 19:30	7439-95-4	
Silver	**0.000083J**	mg/L	0.00050	0.000056	1	07/24/14 09:13	07/25/14 08:28	7440-22-4	
Total Hardness by 2340B	**455**	mg/L	1.4	0.71	20	07/24/14 09:13	07/24/14 19:30		
Uranium-238	**0.0013**	mg/L	0.00050	0.00025	1	07/24/14 09:13	07/24/14 19:28	7440-61-1	
Zinc	**0.078**	mg/L	0.0050	0.0025	1	07/24/14 09:13	07/24/14 19:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/25/14 11:31	07/29/14 15:25	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Sample: LAO-SS-2-072114 **Lab ID: 10274756003** Collected: 07/21/14 10:56 Received: 07/22/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.064**	mg/L	0.010	0.0012	1	07/24/14 09:13	07/24/14 19:33	7429-90-5	
Arsenic	**0.031**	mg/L	0.00050	0.00025	1	07/24/14 09:13	07/24/14 19:33	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000033	1	07/24/14 09:13	07/24/14 19:33	7440-43-9	
Calcium	**160**	mg/L	0.80	0.17	20	07/24/14 09:13	07/24/14 19:36	7440-70-2	
Copper	**0.40**	mg/L	0.0010	0.00022	1	07/24/14 09:13	07/24/14 19:33	7440-50-8	
Iron	**2.2**	mg/L	0.050	0.0080	1	07/24/14 09:13	07/24/14 19:33	7439-89-6	
Lead	**0.0024**	mg/L	0.00010	0.000046	1	07/24/14 09:13	07/24/14 19:33	7439-92-1	
Magnesium	**40.3**	mg/L	0.20	0.057	20	07/24/14 09:13	07/24/14 19:36	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	07/24/14 09:13	07/25/14 08:31	7440-22-4	
Total Hardness by 2340B	**566**	mg/L	1.4	0.71	20	07/24/14 09:13	07/24/14 19:36		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	07/24/14 09:13	07/24/14 19:33	7440-61-1	
Zinc	**4.4**	mg/L	0.10	0.050	20	07/24/14 09:13	07/24/14 19:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	07/25/14 11:31	07/29/14 15:27	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

QC Batch: MERP/11107 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10274756001, 10274756002, 10274756003

METHOD BLANK: 1739706 Matrix: Water
Associated Lab Samples: 10274756001, 10274756002, 10274756003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	07/29/14 15:00	

LABORATORY CONTROL SAMPLE: 1739707

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0046	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1742307 1742308

Parameter	Units	10274445020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0051	102	102	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

QC Batch: MPRP/47636 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10274756001, 10274756002, 10274756003

METHOD BLANK: 1739712 Matrix: Water
Associated Lab Samples: 10274756001, 10274756002, 10274756003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0016J	0.010	07/24/14 18:46	
Arsenic	mg/L	ND	0.00050	07/24/14 18:46	
Cadmium	mg/L	ND	0.000080	07/24/14 18:46	
Calcium	mg/L	0.012J	0.040	07/24/14 18:46	
Copper	mg/L	ND	0.0010	07/24/14 18:46	
Iron	mg/L	ND	0.050	07/24/14 18:46	
Lead	mg/L	ND	0.00010	07/24/14 18:46	
Magnesium	mg/L	0.0051J	0.010	07/24/14 18:46	
Silver	mg/L	ND	0.00050	07/25/14 08:20	
Uranium-238	mg/L	ND	0.00050	07/24/14 18:46	
Zinc	mg/L	ND	0.0050	07/24/14 18:46	

LABORATORY CONTROL SAMPLE: 1739713

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.092	115	85-115	
Arsenic	mg/L	.08	0.088	110	85-115	
Cadmium	mg/L	.08	0.087	109	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Iron	mg/L	1	1.1	109	85-115	
Lead	mg/L	.08	0.088	110	85-115	
Magnesium	mg/L	1	1.1	114	85-115	
Silver	mg/L	.08	0.087	109	85-115	
Uranium-238	mg/L	.08	0.086	107	85-115	
Zinc	mg/L	.08	0.087	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1740952 1740953

Parameter	Units	10274756001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.11	.08	.08	0.24	0.24	164	160	70-130	2	20	M1
Arsenic	mg/L	0.0064	.08	.08	0.095	0.093	111	108	70-130	2	20	
Cadmium	mg/L	0.00024	.08	.08	0.089	0.087	111	109	70-130	2	20	
Calcium	mg/L	130	1	1	134	131	447	109	70-130	3	20	E,M1
Copper	mg/L	0.018	.08	.08	0.10	0.098	103	100	70-130	2	20	
Iron	mg/L	0.15	1	1	1.3	1.3	113	112	70-130	1	20	
Lead	mg/L	0.0027	.08	.08	0.088	0.085	107	103	70-130	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1740952 1740953

Parameter	Units	10274756001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	31.7	1	1	33.7	32.1	201	42	70-130	5	20	M1
Silver	mg/L	ND	.08	.08	0.080	0.080	101	100	70-130	.2	20	
Uranium-238	mg/L	0.0012	.08	.08	0.086	0.084	106	103	70-130	3	20	
Zinc	mg/L	0.062	.08	.08	0.15	0.15	110	104	70-130	3	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10274756

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10274756001	**LAO-SS-1-071714**	EPA 200.8	MPRP/47636	EPA 200.8	ICPM/20987
10274756002	**LAO-SS-1-072114**	EPA 200.8	MPRP/47636	EPA 200.8	ICPM/20987
10274756003	**LAO-SS-2-072114**	EPA 200.8	MPRP/47636	EPA 200.8	ICPM/20987
10274756001	**LAO-SS-1-071714**	EPA 245.1	MERP/11107	EPA 245.1	MERC/12797
10274756002	**LAO-SS-1-072114**	EPA 245.1	MERP/11107	EPA 245.1	MERC/12797
10274756003	**LAO-SS-2-072114**	EPA 245.1	MERP/11107	EPA 245.1	MERC/12797

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

1627436

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): ____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: ____

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 - 071714	7/17/14	1125		X			2			2				X			X								501
	LAO-SS-1 - 072114	7/21/14	9:50		X			2			2				X			X								502
	LAO-SS-2 - 072114	7/21/14	1056		X			1			1				X											503

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DJ Renz, T. Hickey						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	7/21/14	12:00	[signature] / HCC	7-22-14	945
Shipment Method: FedEx Ship Date: 7/21/14						
Shipment Tracking No: 5540920184 74						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP Remediation Management COC - Effective Date: starting August 16, 2011.

BP LaMP COC Rev. 8, 24 June 2012

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer

Project #: WO# : 10274756

10274756

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9201 8474

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.3 **Cooler Temp Corrected (°C):** 3.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** TRUE **Date and Initials of Person Examining Contents:** CMB 7-22-14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 5/5 1-3
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 11:00	Temp: 3.3	Corrected Temp: 3.3
Time: 11:05	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 7/24/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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1700 Elm Street - Suite 200
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September 05, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on July 29, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This is a revised report correcting hardness calculation errors.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee for
Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10275583001	**LAO-SS-1-072414**	Water	07/24/14 08:30	07/29/14 09:25
10275583002	**LAO-SS-1-072814**	Water	07/28/14 12:56	07/29/14 09:25
10275583003	**LAO-SS-2-072814**	Water	07/28/14 13:05	07/29/14 09:25

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10275583001	**LAO-SS-1-072414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10275583002	**LAO-SS-1-072814**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10275583003	**LAO-SS-2-072814**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 05, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/47886

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10275583001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1748395)
  - Aluminum
  - Arsenic
  - Cadmium
  - Calcium
  - Copper
  - Iron
  - Lead
  - Magnesium
  - Silver
  - Uranium-238
  - Zinc
- MSD (Lab ID: 1748396)
  - Aluminum

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 05, 2014

QC Batch: MPRP/47886

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10275583001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Arsenic
- Cadmium
- Calcium
- Copper
- Iron
- Lead
- Magnesium
- Silver
- Uranium-238
- Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/47886

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1748395)
  - Calcium
- MSD (Lab ID: 1748396)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 05, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Sample: LAO-SS-1-072414 **Lab ID: 10275583001** Collected: 07/24/14 08:30 Received: 07/29/14 09:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.12**	mg/L	0.010	0.0012	1	08/01/14 08:27	08/02/14 08:15	7429-90-5	M1
Arsenic	**0.0060**	mg/L	0.00050	0.00025	1	08/01/14 08:27	08/02/14 08:15	7440-38-2	M1
Cadmium	**0.00026**	mg/L	0.000080	0.000033	1	08/01/14 08:27	08/02/14 08:15	7440-43-9	M1
Calcium	**117**	mg/L	1.0	0.21	25	08/01/14 08:27	08/02/14 08:50	7440-70-2	M1
Copper	**0.021**	mg/L	0.0010	0.00022	1	08/01/14 08:27	08/02/14 08:15	7440-50-8	M1
Iron	**0.18**	mg/L	0.050	0.0080	1	08/01/14 08:27	08/02/14 08:15	7439-89-6	M1
Lead	**0.0031**	mg/L	0.00010	0.000046	1	08/01/14 08:27	08/02/14 08:15	7439-92-1	M1
Magnesium	**28.1**	mg/L	0.050	0.014	5	08/01/14 08:27	08/02/14 08:46	7439-95-4	M1
Silver	**0.000069J**	mg/L	0.00050	0.000056	1	08/01/14 08:27	08/02/14 08:15	7440-22-4	M1
Total Hardness by 2340B	**407**	mg/L	1.8	0.89	25	08/01/14 08:27	08/02/14 08:50		
Uranium-238	**0.0012**	mg/L	0.00050	0.00025	1	08/01/14 08:27	08/02/14 08:15	7440-61-1	M1
Zinc	**0.072**	mg/L	0.0050	0.0025	1	08/01/14 08:27	08/02/14 08:15	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/01/14 15:09	08/05/14 16:12	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Sample: LAO-SS-1-072814 **Lab ID: 10275583002** Collected: 07/28/14 12:56 Received: 07/29/14 09:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.086**	mg/L	0.010	0.0012	1	08/01/14 08:27	08/02/14 07:36	7429-90-5	
Arsenic	**0.0060**	mg/L	0.00050	0.00025	1	08/01/14 08:27	08/02/14 07:36	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	08/01/14 08:27	08/02/14 07:36	7440-43-9	
Calcium	**118**	mg/L	0.40	0.084	10	08/01/14 08:27	08/02/14 07:41	7440-70-2	
Copper	**0.019**	mg/L	0.0010	0.00022	1	08/01/14 08:27	08/02/14 07:36	7440-50-8	
Iron	**0.14**	mg/L	0.050	0.0080	1	08/01/14 08:27	08/02/14 07:36	7439-89-6	
Lead	**0.0025**	mg/L	0.00010	0.000046	1	08/01/14 08:27	08/02/14 07:36	7439-92-1	
Magnesium	**25.8**	mg/L	0.10	0.028	10	08/01/14 08:27	08/02/14 07:41	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/01/14 08:27	08/02/14 07:36	7440-22-4	
Total Hardness by 2340B	**400**	mg/L	0.71	0.36	10	08/01/14 08:27	08/02/14 07:41		
Uranium-238	**0.00056**	mg/L	0.00050	0.00025	1	08/01/14 08:27	08/02/14 07:36	7440-61-1	
Zinc	**0.053**	mg/L	0.0050	0.0025	1	08/01/14 08:27	08/02/14 07:36	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/01/14 15:09	08/05/14 16:14	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Sample: LAO-SS-2-072814 **Lab ID: 10275583003** Collected: 07/28/14 13:05 Received: 07/29/14 09:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.031**	mg/L	0.010	0.0012	1	08/01/14 08:27	08/02/14 07:46	7429-90-5	
Arsenic	**0.027**	mg/L	0.00050	0.00025	1	08/01/14 08:27	08/02/14 07:46	7440-38-2	
Cadmium	**0.015**	mg/L	0.000080	0.000033	1	08/01/14 08:27	08/02/14 07:46	7440-43-9	
Calcium	**133**	mg/L	0.40	0.084	10	08/01/14 08:27	08/02/14 07:50	7440-70-2	
Copper	**0.31**	mg/L	0.0010	0.00022	1	08/01/14 08:27	08/02/14 07:46	7440-50-8	
Iron	**1.4**	mg/L	0.050	0.0080	1	08/01/14 08:27	08/02/14 07:46	7439-89-6	
Lead	**0.0014**	mg/L	0.00010	0.000046	1	08/01/14 08:27	08/02/14 07:46	7439-92-1	
Magnesium	**34.7**	mg/L	0.10	0.028	10	08/01/14 08:27	08/02/14 07:50	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/01/14 08:27	08/02/14 07:46	7440-22-4	
Total Hardness by 2340B	**475**	mg/L	0.71	0.36	10	08/01/14 08:27	08/02/14 07:50		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	08/01/14 08:27	08/02/14 07:46	7440-61-1	
Zinc	**3.9**	mg/L	0.050	0.025	10	08/01/14 08:27	08/02/14 07:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/01/14 15:09	08/05/14 16:16	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

QC Batch: MERP/11233 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10275583001, 10275583002, 10275583003

METHOD BLANK: 1749584 | Matrix: Water
Associated Lab Samples: 10275583001, 10275583002, 10275583003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/05/14 16:05	

LABORATORY CONTROL SAMPLE: 1749585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1749586 1749587

Parameter	Units	10275583003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0052	0.0051	105	103	70-130	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

QC Batch: MPRP/47886 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10275583001, 10275583002, 10275583003

METHOD BLANK: 1748393 Matrix: Water
Associated Lab Samples: 10275583001, 10275583002, 10275583003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0015J	0.010	08/02/14 07:32	
Arsenic	mg/L	ND	0.00050	08/02/14 07:32	
Cadmium	mg/L	ND	0.000080	08/02/14 07:32	
Calcium	mg/L	ND	0.040	08/02/14 07:32	
Copper	mg/L	ND	0.0010	08/02/14 07:32	
Iron	mg/L	ND	0.050	08/02/14 07:32	
Lead	mg/L	ND	0.00010	08/02/14 07:32	
Magnesium	mg/L	ND	0.010	08/02/14 07:32	
Silver	mg/L	ND	0.00050	08/02/14 07:32	
Uranium-238	mg/L	ND	0.00050	08/02/14 07:32	
Zinc	mg/L	ND	0.0050	08/02/14 07:32	

LABORATORY CONTROL SAMPLE: 1748394

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.079	99	85-115	
Arsenic	mg/L	.08	0.083	103	85-115	
Cadmium	mg/L	.08	0.082	102	85-115	
Calcium	mg/L	1	1.0	104	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	1.0	102	85-115	
Lead	mg/L	.08	0.081	102	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.085	106	85-115	
Uranium-238	mg/L	.08	0.082	102	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1748395 1748396

Parameter	Units	10275583001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.12	.08	.08	0.12	0.11	-3	-12	70-130	6	20	M1
Arsenic	mg/L	0.0060	.08	.08	0.046	0.045	50	49	70-130	2	20	M1
Cadmium	mg/L	0.00026	.08	.08	0.041	0.040	51	49	70-130	4	20	M1
Calcium	mg/L	117	1	1	56.8	54.6	-6000	-6220	70-130	4	20	E,M1
Copper	mg/L	0.021	.08	.08	0.052	0.050	38	36	70-130	4	20	M1
Iron	mg/L	0.18	1	1	0.62	0.60	43	41	70-130	4	20	M1
Lead	mg/L	0.0031	.08	.08	0.042	0.041	49	47	70-130	3	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1748395 1748396

Parameter	Units	10275583001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	28.1	1	1	14.5	14.0	-1360	-1410	70-130	4	20	M1
Silver	mg/L	0.000069J	.08	.08	0.042	0.041	52	51	70-130	2	20	M1
Uranium-238	mg/L	0.0012	.08	.08	0.042	0.041	51	50	70-130	2	20	M1
Zinc	mg/L	0.072	.08	.08	0.079	0.077	9	6	70-130	2	20	M1

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10275583

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10275583001	**LAO-SS-1-072414**	EPA 200.8	MPRP/47886	EPA 200.8	ICPM/21121
10275583002	**LAO-SS-1-072814**	EPA 200.8	MPRP/47886	EPA 200.8	ICPM/21121
10275583003	**LAO-SS-2-072814**	EPA 200.8	MPRP/47886	EPA 200.8	ICPM/21121
10275583001	**LAO-SS-1-072414**	EPA 245.1	MERP/11233	EPA 245.1	MERC/12902
10275583002	**LAO-SS-1-072814**	EPA 245.1	MERP/11233	EPA 245.1	MERC/12902
10275583003	**LAO-SS-2-072814**	EPA 245.1	MERP/11233	EPA 245.1	MERC/12902

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10275583

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-072414	7/24/14	8:30		X			2			2				X	X	10275583 001
	LAO-SS-1-072814	7/28/14	12:56		X			2			2				X	X	002
	LAO-SS-2-072814	7/28/14	13:05		X			1			1				X		003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: T. Hickey, D Renz						
Sampler's Company: Pioneer Technical Services	IPTS	7/28/14	1330	Pace	7/29/14	925
Shipment Method: FedEx Ship Date: 7/28/14						
Shipment Tracking No: 554092018463						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.1 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 09May2014 Page 1 of 1
	Document No.: F-MN-L-210-rev.12	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10275583

10275583

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9201 8463

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes (TW) ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.1 **Cooler Temp Corrected (°C):** 4.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** TWe **Date and Initials of Person Examining Contents:** DN 7/29/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # ~~1-3~~ 1-2 (2/2) 3 (1/1)
Per method, VOA pH is checked after analysis				Initial when completed: DN Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1230	Temp: ~~4.7 9.7~~	Corrected Temp: ~~4.1 9.7~~	
Time: 1241	put in cooler 4	DT 7/30/14	
Time:	Temp:	Corrected Temp:	

Project Manager Review: **Date:** 7/30/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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August 28, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 05, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

This is a revised report to reflect re-calculated hardness results.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10276503001	**LAO-SS-1-073114**	Water	07/31/14 11:40	08/05/14 09:20
10276503002	**LAO-SS-1-080414**	Water	08/04/14 09:30	08/05/14 09:20
10276503003	**LAO-SS-2-080414**	Water	08/04/14 10:52	08/05/14 09:20

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10276503001	**LAO-SS-1-073114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10276503002	**LAO-SS-1-080414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10276503003	**LAO-SS-2-080414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: August 28, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Sample: LAO-SS-1-073114 **Lab ID: 10276503001** Collected: 07/31/14 11:40 Received: 08/05/14 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.021**	mg/L	0.010	0.0012	1	08/06/14 10:58	08/14/14 17:20	7429-90-5	
Arsenic	**0.0034**	mg/L	0.00050	0.00025	1	08/06/14 10:58	08/14/14 17:20	7440-38-2	
Cadmium	**0.000083**	mg/L	0.000080	0.000033	1	08/06/14 10:58	08/14/14 17:20	7440-43-9	
Calcium	**130**	mg/L	0.80	0.17	20	08/06/14 10:58	08/14/14 17:22	7440-70-2	
Copper	**0.0084**	mg/L	0.0010	0.00022	1	08/06/14 10:58	08/14/14 17:20	7440-50-8	
Iron	**0.035J**	mg/L	0.050	0.0080	1	08/06/14 10:58	08/14/14 17:20	7439-89-6	
Lead	**0.00076**	mg/L	0.00010	0.000046	1	08/06/14 10:58	08/14/14 17:20	7439-92-1	
Magnesium	**20.3**	mg/L	0.010	0.0028	1	08/06/14 10:58	08/14/14 17:20	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/06/14 10:58	08/14/14 17:20	7440-22-4	
Total Hardness by 2340B	**408**	mg/L	1.4	0.71	20	08/06/14 10:58	08/14/14 17:22		
Uranium-238	**0.00037J**	mg/L	0.00050	0.00025	1	08/06/14 10:58	08/14/14 17:20	7440-61-1	
Zinc	**0.025**	mg/L	0.0050	0.0025	1	08/06/14 10:58	08/14/14 17:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/11/14 10:31	08/11/14 15:38	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Sample: LAO-SS-1-080414 **Lab ID: 10276503002** Collected: 08/04/14 09:30 Received: 08/05/14 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.030**	mg/L	0.010	0.0012	1	08/06/14 10:58	08/14/14 17:25	7429-90-5	
Arsenic	**0.0047**	mg/L	0.00050	0.00025	1	08/06/14 10:58	08/14/14 17:25	7440-38-2	
Cadmium	**0.00010**	mg/L	0.000080	0.000033	1	08/06/14 10:58	08/14/14 17:25	7440-43-9	
Calcium	**125**	mg/L	0.80	0.17	20	08/06/14 10:58	08/14/14 17:28	7440-70-2	
Copper	**0.010**	mg/L	0.0010	0.00022	1	08/06/14 10:58	08/14/14 17:25	7440-50-8	
Iron	**0.040J**	mg/L	0.050	0.0080	1	08/06/14 10:58	08/14/14 17:25	7439-89-6	
Lead	**0.00090**	mg/L	0.00010	0.000046	1	08/06/14 10:58	08/14/14 17:25	7439-92-1	
Magnesium	**24.7**	mg/L	0.20	0.057	20	08/06/14 10:58	08/14/14 17:28	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/06/14 10:58	08/14/14 17:25	7440-22-4	
Total Hardness by 2340B	**413**	mg/L	1.4	0.71	20	08/06/14 10:58	08/14/14 17:28		
Uranium-238	**0.00068**	mg/L	0.00050	0.00025	1	08/06/14 10:58	08/14/14 17:25	7440-61-1	
Zinc	**0.029**	mg/L	0.0050	0.0025	1	08/06/14 10:58	08/14/14 17:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/11/14 10:31	08/11/14 15:40	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Sample: LAO-SS-2-080414 **Lab ID: 10276503003** Collected: 08/04/14 10:52 Received: 08/05/14 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.062**	mg/L	0.010	0.0012	1	08/06/14 10:58	08/14/14 17:31	7429-90-5	
Arsenic	**0.031**	mg/L	0.00050	0.00025	1	08/06/14 10:58	08/14/14 17:31	7440-38-2	
Cadmium	**0.017**	mg/L	0.000080	0.000033	1	08/06/14 10:58	08/14/14 17:31	7440-43-9	
Calcium	**135**	mg/L	0.80	0.17	20	08/06/14 10:58	08/14/14 17:34	7440-70-2	
Copper	**0.45**	mg/L	0.020	0.0043	20	08/06/14 10:58	08/14/14 17:34	7440-50-8	
Iron	**2.3**	mg/L	0.050	0.0080	1	08/06/14 10:58	08/14/14 17:31	7439-89-6	
Lead	**0.0026**	mg/L	0.00010	0.000046	1	08/06/14 10:58	08/14/14 17:31	7439-92-1	
Magnesium	**34.3**	mg/L	0.20	0.057	20	08/06/14 10:58	08/14/14 17:34	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/06/14 10:58	08/14/14 17:31	7440-22-4	
Total Hardness by 2340B	**478**	mg/L	1.4	0.71	20	08/06/14 10:58	08/14/14 17:34		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	08/06/14 10:58	08/14/14 17:31	7440-61-1	
Zinc	**4.6**	mg/L	0.10	0.050	20	08/06/14 10:58	08/14/14 17:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/11/14 10:31	08/11/14 15:42	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

QC Batch: MERP/11299 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10276503001, 10276503002, 10276503003

METHOD BLANK: 1755670 Matrix: Water
Associated Lab Samples: 10276503001, 10276503002, 10276503003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/11/14 15:27	

LABORATORY CONTROL SAMPLE: 1755671

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0045	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1755672 1755673

Parameter	Units	10275833009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0047	0.0046	94	92	70-130	3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

QC Batch: MPRP/48022 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10276503001, 10276503002, 10276503003

METHOD BLANK: 1752960 Matrix: Water
Associated Lab Samples: 10276503001, 10276503002, 10276503003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0018J	0.010	08/14/14 16:11	
Arsenic	mg/L	ND	0.00050	08/14/14 16:11	
Cadmium	mg/L	ND	0.000080	08/14/14 16:11	
Calcium	mg/L	ND	0.040	08/14/14 16:11	
Copper	mg/L	ND	0.0010	08/14/14 16:11	
Iron	mg/L	ND	0.050	08/14/14 16:11	
Lead	mg/L	ND	0.00010	08/14/14 16:11	
Magnesium	mg/L	ND	0.010	08/14/14 16:11	
Silver	mg/L	ND	0.00050	08/14/14 16:11	
Uranium-238	mg/L	ND	0.00050	08/14/14 16:11	
Zinc	mg/L	ND	0.0050	08/14/14 16:11	

LABORATORY CONTROL SAMPLE: 1752961

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.084	105	85-115	
Cadmium	mg/L	.08	0.088	110	85-115	
Calcium	mg/L	1	1.0	104	85-115	
Copper	mg/L	.08	0.086	108	85-115	
Iron	mg/L	1	1.1	110	85-115	
Lead	mg/L	.08	0.088	109	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Silver	mg/L	.08	0.087	109	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.088	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1752962 1752963

Parameter	Units	10276488001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	79.8 ug/L	.08	.08	0.18	0.17	124	118	70-130	3	20	
Arsenic	mg/L	2.5 ug/L	.08	.08	0.087	0.086	105	105	70-130	0	20	
Cadmium	mg/L	0.038J ug/L	.08	.08	0.090	0.089	112	112	70-130	1	20	
Calcium	mg/L	31500 ug/L	1	1	32.6	32.7	113	125	70-130	0	20	
Copper	mg/L	1.1 ug/L	.08	.08	0.087	0.086	107	106	70-130	1	20	
Iron	mg/L	67.0 ug/L	1	1	1.2	1.2	114	113	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1752962 1752963

Parameter	Units	10276488001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.28 ug/L	.08	.08	0.085	0.086	106	107	70-130	1	20	
Magnesium	mg/L	6480 ug/L	1	1	7.3	7.3	86	81	70-130	1	20	
Silver	mg/L	0.14J ug/L	.08	.08	0.082	0.082	103	103	70-130	0	20	
Uranium-238	mg/L	ND	.08	.08	0.081	0.080	101	99	70-130	2	20	
Zinc	mg/L	14.0 ug/L	.08	.08	0.091	0.091	96	96	70-130	0	20	

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10276503

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10276503001	**LAO-SS-1-073114**	EPA 200.8	MPRP/48022	EPA 200.8	ICPM/21264
10276503002	**LAO-SS-1-080414**	EPA 200.8	MPRP/48022	EPA 200.8	ICPM/21264
10276503003	**LAO-SS-2-080414**	EPA 200.8	MPRP/48022	EPA 200.8	ICPM/21264
10276503001	**LAO-SS-1-073114**	EPA 245.1	MERP/11299	EPA 245.1	MERC/13009
10276503002	**LAO-SS-1-080414**	EPA 245.1	MERP/11299	EPA 245.1	MERC/13009
10276503003	**LAO-SS-2-080414**	EPA 245.1	MERP/11299	EPA 245.1	MERC/13009

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Laboratory Management Program LaMP Chain of Custody Record

bp rm

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 1027605023

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-073114	7/31/14	11:40		X			2			2				X			X								001
	LAO-SS-1-080414	8/4/14	9:30		X			2			2				X			X								002
	LAO-SS-2-080414	8/4/14	10:52		X			1			1				X											003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: T. Hickey						
Sampler's Company: Pioneer Technical Services	[signature] PTS	8/4/14	12:00	[signature] Pace	8-5-14	9:20
Shipment Method: Fed Ex Ship Date: 8/4/14						
Shipment Tracking No: 5540920 1 8452						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.4 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer Technical Services

Project #: WO#: 10276503

10276503

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9201 8452

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.4 **Cooler Temp Corrected (°C):** 4.4 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.0 **Date and Initials of Person Examining Contents:** DH 8-5-14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. 2/1 ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 16:15	Temp: 4.4	Corrected Temp:
Time: 16:25	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 22, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 12, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10277290001	**LAO-SS-1 - 080714**	Water	08/07/14 13:00	08/12/14 09:45
10277290002	**LAO-SS-1 - 081114**	Water	08/11/14 09:22	08/12/14 09:45
10277290003	**LAO-SS-2 - 081114**	Water	08/11/14 10:35	08/12/14 09:45

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SAMPLE ANALYTE COUNT

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10277290001	**LAO-SS-1 - 080714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10277290002	**LAO-SS-1 - 081114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10277290003	**LAO-SS-2 - 081114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 22, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/48218

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10277290001,10277302001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1759268)
  - Aluminum
- MS (Lab ID: 1759270)
  - Aluminum
  - Calcium
  - Magnesium
- MSD (Lab ID: 1759269)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: August 22, 2014

Analyte Comments:

QC Batch: MPRP/48218

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1759270)
  - Calcium

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PROJECT NARRATIVE

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: August 22, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Sample: LAO-SS-1 - 080714 **Lab ID: 10277290001** Collected: 08/07/14 13:00 Received: 08/12/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.12**	mg/L	0.010	0.0012	1	08/14/14 10:26	08/18/14 20:32	7429-90-5	M1
Arsenic	**0.0059**	mg/L	0.00050	0.00025	1	08/14/14 10:26	08/18/14 20:32	7440-38-2	
Cadmium	**0.00025**	mg/L	0.000080	0.000033	1	08/14/14 10:26	08/18/14 20:32	7440-43-9	
Calcium	**120**	mg/L	0.80	0.17	20	08/14/14 10:26	08/18/14 20:34	7440-70-2	M1
Copper	**0.024**	mg/L	0.0010	0.00022	1	08/14/14 10:26	08/18/14 20:32	7440-50-8	
Iron	**0.17**	mg/L	0.050	0.0080	1	08/14/14 10:26	08/18/14 20:32	7439-89-6	
Lead	**0.0036**	mg/L	0.00010	0.000046	1	08/14/14 10:26	08/18/14 20:32	7439-92-1	
Magnesium	**26.6**	mg/L	0.20	0.057	20	08/14/14 10:26	08/18/14 20:34	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	08/14/14 10:26	08/18/14 20:32	7440-22-4	
Total Hardness by 2340B	**410**	mg/L	1.4	0.71	20	08/14/14 10:26	08/18/14 20:34		
Uranium-238	**0.00091**	mg/L	0.00050	0.00025	1	08/14/14 10:26	08/18/14 20:32	7440-61-1	
Zinc	**0.070**	mg/L	0.0050	0.0025	1	08/14/14 10:26	08/18/14 20:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/14/14 09:19	08/21/14 14:49	7439-97-6	

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ANALYTICAL RESULTS

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Sample: LAO-SS-1 - 081114 **Lab ID: 10277290002** Collected: 08/11/14 09:22 Received: 08/12/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.026**	mg/L	0.010	0.0012	1	08/14/14 10:26	08/18/14 20:43	7429-90-5	
Arsenic	**0.0050**	mg/L	0.00050	0.00025	1	08/14/14 10:26	08/18/14 20:43	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	08/14/14 10:26	08/18/14 20:43	7440-43-9	
Calcium	**118**	mg/L	0.80	0.17	20	08/14/14 10:26	08/18/14 20:46	7440-70-2	
Copper	**0.010**	mg/L	0.0010	0.00022	1	08/14/14 10:26	08/18/14 20:43	7440-50-8	
Iron	**0.042J**	mg/L	0.050	0.0080	1	08/14/14 10:26	08/18/14 20:43	7439-89-6	
Lead	**0.00091**	mg/L	0.00010	0.000046	1	08/14/14 10:26	08/18/14 20:43	7439-92-1	
Magnesium	**28.1**	mg/L	0.20	0.057	20	08/14/14 10:26	08/18/14 20:46	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/14/14 10:26	08/18/14 20:43	7440-22-4	
Total Hardness by 2340B	**411**	mg/L	1.4	0.71	20	08/14/14 10:26	08/18/14 20:46		
Uranium-238	**0.00088**	mg/L	0.00050	0.00025	1	08/14/14 10:26	08/18/14 20:43	7440-61-1	
Zinc	**0.031**	mg/L	0.0050	0.0025	1	08/14/14 10:26	08/18/14 20:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/14/14 09:19	08/21/14 14:51	7439-97-6	

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ANALYTICAL RESULTS

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Sample: LAO-SS-2 - 081114 **Lab ID: 10277290003** Collected: 08/11/14 10:35 Received: 08/12/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.048**	mg/L	0.010	0.0012	1	08/14/14 10:26	08/18/14 20:49	7429-90-5	
Arsenic	**0.028**	mg/L	0.00050	0.00025	1	08/14/14 10:26	08/18/14 20:49	7440-38-2	
Cadmium	**0.015**	mg/L	0.000080	0.000033	1	08/14/14 10:26	08/18/14 20:49	7440-43-9	
Calcium	**141**	mg/L	0.80	0.17	20	08/14/14 10:26	08/18/14 20:51	7440-70-2	
Copper	**0.38**	mg/L	0.0010	0.00022	1	08/14/14 10:26	08/18/14 20:49	7440-50-8	
Iron	**1.9**	mg/L	0.050	0.0080	1	08/14/14 10:26	08/18/14 20:49	7439-89-6	
Lead	**0.0020**	mg/L	0.00010	0.000046	1	08/14/14 10:26	08/18/14 20:49	7439-92-1	
Magnesium	**34.2**	mg/L	0.20	0.057	20	08/14/14 10:26	08/18/14 20:51	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/14/14 10:26	08/18/14 20:49	7440-22-4	
Total Hardness by 2340B	**493**	mg/L	1.4	0.71	20	08/14/14 10:26	08/18/14 20:51		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	08/14/14 10:26	08/18/14 20:49	7440-61-1	
Zinc	**4.0**	mg/L	0.10	0.050	20	08/14/14 10:26	08/18/14 20:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/14/14 09:19	08/21/14 14:59	7439-97-6	

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QUALITY CONTROL DATA

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

QC Batch: MERP/11347 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10277290001, 10277290002, 10277290003

METHOD BLANK: 1759319 Matrix: Water
Associated Lab Samples: 10277290001, 10277290002, 10277290003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/21/14 14:44	

LABORATORY CONTROL SAMPLE: 1759320

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0051	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1759321 1759322

Parameter	Units	10277290002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0050	0.0050	101	100	70-130	1	20	

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QUALITY CONTROL DATA

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

QC Batch: MPRP/48218 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10277290001, 10277290002, 10277290003

METHOD BLANK: 1759266 Matrix: Water
Associated Lab Samples: 10277290001, 10277290002, 10277290003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0015J	0.010	08/18/14 19:00	
Arsenic	mg/L	ND	0.00050	08/18/14 19:00	
Cadmium	mg/L	ND	0.000080	08/18/14 19:00	
Calcium	mg/L	ND	0.040	08/18/14 19:00	
Copper	mg/L	ND	0.0010	08/18/14 19:00	
Iron	mg/L	ND	0.050	08/18/14 19:00	
Lead	mg/L	ND	0.00010	08/18/14 19:00	
Magnesium	mg/L	ND	0.010	08/18/14 19:00	
Silver	mg/L	ND	0.00050	08/18/14 19:00	
Uranium-238	mg/L	ND	0.00050	08/18/14 19:00	
Zinc	mg/L	ND	0.0050	08/18/14 19:00	

LABORATORY CONTROL SAMPLE: 1759267

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	107	85-115	
Arsenic	mg/L	.08	0.083	104	85-115	
Cadmium	mg/L	.08	0.086	107	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	1.1	110	85-115	
Lead	mg/L	.08	0.085	107	85-115	
Magnesium	mg/L	1	1.0	103	85-115	
Silver	mg/L	.08	0.082	103	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.086	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1759268 1759269

Parameter	Units	10277302001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	99.7 ug/L	.08	.08	0.21	0.20	142	127	70-130	6	20	M1
Arsenic	mg/L	2.7 ug/L	.08	.08	0.086	0.086	104	104	70-130	0	20	
Cadmium	mg/L	0.050J ug/L	.08	.08	0.085	0.085	107	106	70-130	1	20	
Calcium	mg/L	37100 ug/L	1	1	38.3	38.5	129	148	70-130	1	20	M1
Copper	mg/L	1.3 ug/L	.08	.08	0.083	0.084	102	103	70-130	1	20	
Iron	mg/L	62.4 ug/L	1	1	1.1	1.1	103	103	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1759268 1759269

Parameter	Units	10277302001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.37 ug/L	.08	.08	0.085	0.083	106	103	70-130	2	20	
Magnesium	mg/L	9730 ug/L	1	1	10.6	10.6	86	84	70-130	0	20	
Silver	mg/L	0.13J ug/L	.08	.08	0.080	0.078	99	97	70-130	3	20	
Uranium-238	mg/L	ND	.08	.08	0.078	0.079	98	99	70-130	1	20	
Zinc	mg/L	3.5J ug/L	.08	.08	0.088	0.086	106	104	70-130	2	20	

MATRIX SPIKE SAMPLE: 1759270

Parameter	Units	10277290001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.12	.08	0.24	150	70-130	M1
Arsenic	mg/L	0.0059	.08	0.089	104	70-130	
Cadmium	mg/L	0.00025	.08	0.084	105	70-130	
Calcium	mg/L	120	1	124	332	70-130	E,M1
Copper	mg/L	0.024	.08	0.11	104	70-130	
Iron	mg/L	0.17	1	1.2	103	70-130	
Lead	mg/L	0.0036	.08	0.086	103	70-130	
Magnesium	mg/L	26.6	1	30.0	340	70-130	M1
Silver	mg/L	ND	.08	0.069	86	70-130	
Uranium-238	mg/L	0.00091	.08	0.078	97	70-130	
Zinc	mg/L	0.070	.08	0.16	112	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BP-MT LAO Wetlands (Weekly)
Pace Project No.: 10277290

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10277290001	**LAO-SS-1 - 080714**	EPA 200.8	MPRP/48218	EPA 200.8	ICPM/21326
10277290002	**LAO-SS-1 - 081114**	EPA 200.8	MPRP/48218	EPA 200.8	ICPM/21326
10277290003	**LAO-SS-2 - 081114**	EPA 200.8	MPRP/48218	EPA 200.8	ICPM/21326
10277290001	**LAO-SS-1 - 080714**	EPA 245.1	MERP/11347	EPA 245.1	MERC/13057
10277290002	**LAO-SS-1 - 081114**	EPA 245.1	MERP/11347	EPA 245.1	MERC/13057
10277290003	**LAO-SS-2 - 081114**	EPA 245.1	MERP/11347	EPA 245.1	MERC/13057

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10277290

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial / 1146 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Tim Hilmo

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 - 080714	8/7/14	1300		X			2			2				X			X								
	LAO-SS-1 - 081114	8/11/14	0922		X			2			2				X			X								
	LAO-SS-2 - 081114	8/11/14	1035		X			1			1				X											

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: DJ Renz, T. Hurley	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] / PTS	8/11/14	12:00	[signature]	8/12/14	945
Shipment Method: Fed Ex Ship Date: 8/11/14						
Shipment Tracking No: 5940920184 41						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: Sample Condition Upon Receipt Form - ESI	Document Revised: 09May2014 Page 1 of 1
	Document No.: F-MN-L-210-rev.12	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP-PioneerTech

Project #: WO#: 10277290

10277290

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] SpeeDee [ ] Other:

Tracking Number: 5540920184 41

Custody Seal on Cooler/Box Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Optional: Proj. Due Date: Proj. Name:

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [X] None [ ] Other: **Temp Blank?** [ ] Yes [X] No

Thermom. Used: [ ] B88A9130516413 [ ] B88A912167504 [X] B88A9132521491 **Type of Ice:** [X] Wet [ ] Blue [ ] None [ ] Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.0 **Cooler Temp Corrected (°C):** 1.0 **Biological Tissue Frozen?** [ ] Yes [ ] No [X] NA

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** 8/12/14

				Comments:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Chain of Custody Filled Out?	[X] Yes	[ ] No	[ ] N/A	2.
Chain of Custody Relinquished?	[X] Yes	[ ] No	[ ] N/A	3.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	4.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	5.
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[X] No	[ ] N/A	6.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	[ ] Yes	[ ] No	[X] N/A	8.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	9.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	10.
Filtered Volume Received for Dissolved Tests?	[X] Yes	[ ] No	[ ] N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	[X] Yes	[ ] No	[ ] N/A	12.
All containers needing acid/base preservation have been checked?	[X] Yes	[ ] No	[ ] N/A	13. [X] HNO_3 [ ] H_2SO_4 [ ] NaOH [ ] HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	[X] Yes	[ ] No	[ ] N/A	Sample # 1-3 1,2: 0/2 3: 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	[ ] Yes	[ ] No	[X] N/A	14.
3 Trip Blanks Present?	[ ] Yes	[ ] No	[X] N/A	15.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 1436 Temp: 1.0	Corrected Temp:
Time: 1442 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: CL **Date:** 8/13/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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September 15, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 19, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee for
Julie Thieschafer
julie.thieschafer@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10278295001	**LAO-SS-1-081414**	Water	08/14/14 12:00	08/19/14 11:50
10278295002	**LAO-SS-1-081814**	Water	08/18/14 10:40	08/19/14 11:50
10278295003	**LAO-SS-2-081814**	Water	08/18/14 12:40	08/19/14 11:50
10278295004	**LAO-SS-IT-081814**	Water	08/18/14 10:40	08/19/14 11:50
10278295005	**LAO-SS-3-081814**	Water	08/18/14 11:00	08/19/14 11:50
10278295006	**LAO-SS-4-081814**	Water	08/18/14 12:20	08/19/14 11:50

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10278295001	**LAO-SS-1-081414**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10278295002	**LAO-SS-1-081814**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	JFP	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10278295003	**LAO-SS-2-081814**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	JFP	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10278295004	**LAO-SS-IT-081814**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	JFP	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10278295005	**LAO-SS-3-081814**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	JFP	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10278295006	**LAO-SS-4-081814**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	JFP	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 15, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/48425

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10278268021,10278295001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1766309)
  - Aluminum
  - Calcium
- MS (Lab ID: 1766311)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1766310)
  - Aluminum
  - Calcium
  - Magnesium
- MSD (Lab ID: 1766312)
  - Calcium
  - Magnesium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 15, 2014

Additional Comments:

Analyte Comments:

QC Batch: MPRP/48425

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1766311)
  - Calcium
- MSD (Lab ID: 1766312)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 15, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: September 15, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: September 15, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: September 15, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: September 15, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/19918

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10278295002,10278400004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1774343)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1774345)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1774344)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Sample: LAO-SS-1-081414 **Lab ID: 10278295001** Collected: 08/14/14 12:00 Received: 08/19/14 11:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.070**	mg/L	0.010	0.0012	1	08/29/14 08:48	09/02/14 14:43	7429-90-5	
Arsenic	**0.0050**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 14:43	7440-38-2	
Cadmium	**0.00012**	mg/L	0.000080	0.000033	1	08/29/14 08:48	09/02/14 14:43	7440-43-9	
Calcium	**116**	mg/L	2.0	0.42	50	08/29/14 08:48	09/03/14 09:36	7440-70-2	M1
Copper	**0.012**	mg/L	0.0010	0.00022	1	08/29/14 08:48	09/02/14 14:43	7440-50-8	
Iron	**0.071**	mg/L	0.050	0.0080	1	08/29/14 08:48	09/02/14 14:43	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	08/29/14 08:48	09/02/14 14:43	7439-92-1	
Magnesium	**27.8**	mg/L	0.50	0.14	50	08/29/14 08:48	09/03/14 09:36	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	08/29/14 08:48	09/02/14 14:43	7440-22-4	
Total Hardness by 2340B	**404**	mg/L	3.6	1.8	50	08/29/14 08:48	09/03/14 09:36		
Uranium-238	**0.00070**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 14:43	7440-61-1	
Zinc	**0.035**	mg/L	0.0050	0.0025	1	08/29/14 08:48	09/02/14 14:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/28/14 08:38	08/28/14 16:45	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Sample: LAO-SS-1-081814 **Lab ID: 10278295002** Collected: 08/18/14 10:40 Received: 08/19/14 11:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.095**	mg/L	0.010	0.0012	1	08/29/14 08:48	09/02/14 15:16	7429-90-5	
Arsenic	**0.0049**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:16	7440-38-2	
Cadmium	**0.00024**	mg/L	0.000080	0.000033	1	08/29/14 08:48	09/02/14 15:16	7440-43-9	
Calcium	**113**	mg/L	0.40	0.084	10	08/29/14 08:48	09/02/14 15:19	7440-70-2	
Copper	**0.019**	mg/L	0.0010	0.00022	1	08/29/14 08:48	09/02/14 15:16	7440-50-8	
Iron	**0.14**	mg/L	0.050	0.0080	1	08/29/14 08:48	09/02/14 15:16	7439-89-6	
Lead	**0.0031**	mg/L	0.00010	0.000046	1	08/29/14 08:48	09/02/14 15:16	7439-92-1	
Magnesium	**26.5**	mg/L	0.10	0.028	10	08/29/14 08:48	09/02/14 15:19	7439-95-4	
Silver	**0.00014J**	mg/L	0.00050	0.000056	1	08/29/14 08:48	09/02/14 15:16	7440-22-4	
Total Hardness by 2340B	**392**	mg/L	0.71	0.36	10	08/29/14 08:48	09/02/14 15:19		
Uranium-238	**0.00072**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:16	7440-61-1	
Zinc	**0.060**	mg/L	0.0050	0.0025	1	08/29/14 08:48	09/02/14 15:16	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/28/14 08:38	08/28/14 16:47	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**25.4**	mg/L	5.0	2.5	1		08/27/14 12:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**706**	mg/L	10.0	5.0	1		08/23/14 20:08		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**8.0J**	mg/L	10.0	5.0	1		08/23/14 20:09		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.23**	mg/L	0.10	0.050	1		08/29/14 16:57		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Sample: LAO-SS-2-081814 **Lab ID: 10278295003** Collected: 08/18/14 12:40 Received: 08/19/14 11:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.079**	mg/L	0.010	0.0012	1	08/29/14 08:48	09/02/14 15:22	7429-90-5	
Arsenic	**0.038**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:22	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	08/29/14 08:48	09/02/14 15:22	7440-43-9	
Calcium	**132**	mg/L	0.40	0.084	10	08/29/14 08:48	09/02/14 15:25	7440-70-2	
Copper	**0.54**	mg/L	0.010	0.0022	10	08/29/14 08:48	09/02/14 15:25	7440-50-8	
Iron	**2.3**	mg/L	0.050	0.0080	1	08/29/14 08:48	09/02/14 15:22	7439-89-6	
Lead	**0.0025**	mg/L	0.00010	0.000046	1	08/29/14 08:48	09/02/14 15:22	7439-92-1	
Magnesium	**33.9**	mg/L	0.10	0.028	10	08/29/14 08:48	09/02/14 15:25	7439-95-4	
Silver	**0.000064J**	mg/L	0.00050	0.000056	1	08/29/14 08:48	09/02/14 15:22	7440-22-4	
Total Hardness by 2340B	**469**	mg/L	0.71	0.36	10	08/29/14 08:48	09/02/14 15:25		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:22	7440-61-1	
Zinc	**4.9**	mg/L	0.050	0.025	10	08/29/14 08:48	09/02/14 15:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/28/14 08:38	08/28/14 16:50	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**106**	mg/L	5.0	2.5	1		08/27/14 13:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**757**	mg/L	10.0	5.0	1		08/23/14 20:08		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**9.0J**	mg/L	10.0	5.0	1		08/23/14 20:09		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.47**	mg/L	0.10	0.050	1		08/29/14 17:02		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Sample: LAO-SS-IT-081814 **Lab ID: 10278295004** Collected: 08/18/14 10:40 Received: 08/19/14 11:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.080**	mg/L	0.010	0.0012	1	08/29/14 08:48	09/02/14 15:37	7429-90-5	
Arsenic	**0.0047**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:37	7440-38-2	
Cadmium	**0.00021**	mg/L	0.000080	0.000033	1	08/29/14 08:48	09/02/14 15:37	7440-43-9	
Calcium	**109**	mg/L	0.40	0.084	10	08/29/14 08:48	09/02/14 15:40	7440-70-2	
Copper	**0.017**	mg/L	0.0010	0.00022	1	08/29/14 08:48	09/02/14 15:37	7440-50-8	
Iron	**0.12**	mg/L	0.050	0.0080	1	08/29/14 08:48	09/02/14 15:37	7439-89-6	
Lead	**0.0027**	mg/L	0.00010	0.000046	1	08/29/14 08:48	09/02/14 15:37	7439-92-1	
Magnesium	**25.7**	mg/L	0.10	0.028	10	08/29/14 08:48	09/02/14 15:40	7439-95-4	
Silver	**0.000059J**	mg/L	0.00050	0.000056	1	08/29/14 08:48	09/02/14 15:37	7440-22-4	
Total Hardness by 2340B	**377**	mg/L	0.71	0.36	10	08/29/14 08:48	09/02/14 15:40		
Uranium-238	**0.00069**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:37	7440-61-1	
Zinc	**0.054**	mg/L	0.0050	0.0025	1	08/29/14 08:48	09/02/14 15:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/28/14 08:38	08/28/14 17:02	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**25.2**	mg/L	5.0	2.5	1		08/27/14 14:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**687**	mg/L	10.0	5.0	1		08/23/14 20:08		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**15.0**	mg/L	10.0	5.0	1		08/23/14 20:09		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.25**	mg/L	0.10	0.050	1		08/29/14 17:06		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Sample: LAO-SS-3-081814 **Lab ID: 10278295005** Collected: 08/18/14 11:00 Received: 08/19/14 11:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.37**	mg/L	0.010	0.0012	1	08/29/14 08:48	09/02/14 15:43	7429-90-5	
Arsenic	**0.0041**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:43	7440-38-2	
Cadmium	**0.038**	mg/L	0.000080	0.000033	1	08/29/14 08:48	09/02/14 15:43	7440-43-9	
Calcium	**134**	mg/L	0.40	0.084	10	08/29/14 08:48	09/02/14 15:46	7440-70-2	
Copper	**2.0**	mg/L	0.010	0.0022	10	08/29/14 08:48	09/02/14 15:46	7440-50-8	
Iron	**10.6**	mg/L	0.050	0.0080	1	08/29/14 08:48	09/02/14 15:43	7439-89-6	
Lead	**0.0020**	mg/L	0.00010	0.000046	1	08/29/14 08:48	09/02/14 15:43	7439-92-1	
Magnesium	**36.4**	mg/L	0.10	0.028	10	08/29/14 08:48	09/02/14 15:46	7439-95-4	
Silver	**0.000082J**	mg/L	0.00050	0.000056	1	08/29/14 08:48	09/02/14 15:43	7440-22-4	
Total Hardness by 2340B	**485**	mg/L	0.71	0.36	10	08/29/14 08:48	09/02/14 15:46		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:43	7440-61-1	
Zinc	**7.5**	mg/L	0.25	0.12	50	08/29/14 08:48	09/03/14 09:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/28/14 08:38	08/28/14 17:05	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**72.8**	mg/L	5.0	2.5	1		08/27/14 14:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**852**	mg/L	10.0	5.0	1		08/23/14 20:08		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**25.0**	mg/L	10.0	5.0	1		08/23/14 20:09		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.3**	mg/L	0.10	0.050	1		08/29/14 17:06		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Sample: LAO-SS-4-081814 **Lab ID: 10278295006** Collected: 08/18/14 12:20 Received: 08/19/14 11:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.059**	mg/L	0.010	0.0012	1	08/29/14 08:48	09/02/14 15:49	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:49	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	08/29/14 08:48	09/02/14 15:49	7440-43-9	
Calcium	ND	mg/L	0.040	0.0084	1	08/29/14 08:48	09/02/14 15:49	7440-70-2	
Copper	**0.00049J**	mg/L	0.0010	0.00022	1	08/29/14 08:48	09/02/14 15:49	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	08/29/14 08:48	09/02/14 15:49	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	08/29/14 08:48	09/02/14 15:49	7439-92-1	
Magnesium	ND	mg/L	0.010	0.0028	1	08/29/14 08:48	09/02/14 15:49	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	08/29/14 08:48	09/02/14 15:49	7440-22-4	
Total Hardness by 2340B	ND	mg/L	0.071	0.036	1	08/29/14 08:48	09/02/14 15:49		
Uranium-238	ND	mg/L	0.00050	0.00025	1	08/29/14 08:48	09/02/14 15:49	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	08/29/14 08:48	09/02/14 15:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	08/28/14 08:38	08/28/14 17:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		08/27/14 14:43		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		08/23/14 20:08		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		08/23/14 20:09		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		08/29/14 17:07		

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

QC Batch: MERP/11477 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10278295001, 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

METHOD BLANK: 1772016 Matrix: Water
Associated Lab Samples: 10278295001, 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	08/28/14 16:40	

LABORATORY CONTROL SAMPLE: 1772017

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1772018 1772019

Parameter	Units	10278295003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0044	98	89	70-130	10	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

QC Batch: MPRP/48425 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10278295001, 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

METHOD BLANK: 1766307 Matrix: Water
Associated Lab Samples: 10278295001, 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0013J	0.010	08/29/14 12:55	
Arsenic	mg/L	ND	0.00050	08/29/14 12:55	
Cadmium	mg/L	ND	0.000080	08/29/14 12:55	
Calcium	mg/L	0.0088J	0.040	08/29/14 12:55	
Copper	mg/L	ND	0.0010	08/29/14 12:55	
Iron	mg/L	ND	0.050	08/29/14 12:55	
Lead	mg/L	ND	0.00010	08/29/14 12:55	
Magnesium	mg/L	ND	0.010	08/29/14 12:55	
Silver	mg/L	ND	0.00050	08/29/14 12:55	
Uranium-238	mg/L	ND	0.00050	08/29/14 12:55	
Zinc	mg/L	ND	0.0050	08/29/14 12:55	

LABORATORY CONTROL SAMPLE: 1766308

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.089	111	85-115	
Arsenic	mg/L	.08	0.085	106	85-115	
Cadmium	mg/L	.08	0.089	111	85-115	
Calcium	mg/L	1	1.1	110	85-115	
Copper	mg/L	.08	0.087	109	85-115	
Iron	mg/L	1	1.1	111	85-115	
Lead	mg/L	.08	0.090	113	85-115	
Magnesium	mg/L	1	1.1	108	85-115	
Silver	mg/L	.08	0.087	109	85-115	
Uranium-238	mg/L	.08	0.087	109	85-115	
Zinc	mg/L	.08	0.089	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1766309 1766310

Parameter	Units	10278268021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.87	.08	.08	1.2	1.2	460	437	70-130	1	20	M1
Arsenic	mg/L	0.0085	.08	.08	0.092	0.095	104	108	70-130	4	20	
Cadmium	mg/L	0.00027	.08	.08	0.085	0.088	106	109	70-130	3	20	
Calcium	mg/L	33300 ug/L	1	1	33.9	36.0	65	268	70-130	6	20	M1
Copper	mg/L	0.042	.08	.08	0.13	0.13	107	111	70-130	3	20	
Iron	mg/L	1.1	1	1	2.3	2.3	120	118	70-130	.8	20	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1766309 1766310

Parameter	Units	10278268021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.015	.08	.08	0.10	0.10	108	111	70-130	2	20	
Magnesium	mg/L	8060 ug/L	1	1	9.1	9.4	104	136	70-130	3	20	M1
Silver	mg/L	0.00025J	.08	.08	0.083	0.087	104	108	70-130	4	20	
Uranium-238	mg/L	1.6 ug/L	.08	.08	0.086	0.088	105	108	70-130	3	20	
Zinc	mg/L	0.097	.08	.08	0.19	0.19	111	116	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1766311 1766312

Parameter	Units	10278295001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.070	.08	.08	0.16	0.15	107	97	70-130	5	20	
Arsenic	mg/L	0.0050	.08	.08	0.092	0.090	108	107	70-130	1	20	
Cadmium	mg/L	0.00012	.08	.08	0.085	0.086	107	107	70-130	.3	20	
Calcium	mg/L	116	1	1	116	119	41	336	70-130	3	20	E,M1
Copper	mg/L	0.012	.08	.08	0.098	0.096	107	106	70-130	1	20	
Iron	mg/L	0.071	1	1	1.1	1.1	106	108	70-130	1	20	
Lead	mg/L	0.0016	.08	.08	0.085	0.086	104	105	70-130	.9	20	
Magnesium	mg/L	27.8	1	1	31.1	32.0	331	425	70-130	3	20	M1
Silver	mg/L	ND	.08	.08	0.086	0.086	108	107	70-130	.2	20	
Uranium-238	mg/L	0.00070	.08	.08	0.084	0.084	104	104	70-130	.7	20	
Zinc	mg/L	0.035	.08	.08	0.12	0.12	112	108	70-130	3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

QC Batch: WET/37748 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

METHOD BLANK: 1771515 Matrix: Water
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	08/27/14 11:05	

LABORATORY CONTROL SAMPLE & LCSD: 1771516 1771517

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.1	41.3	103	103	90-110	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1771518 1771519

Parameter	Units	10278134026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	70.8	40	40	112	111	103	101	80-120	.7	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1771520 1771521

Parameter	Units	10278295002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	25.4	40	40	62.1	63.8	92	96	80-120	3	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

QC Batch: WET/37707 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

METHOD BLANK: 1769675 Matrix: Water
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	08/23/14 20:08	

LABORATORY CONTROL SAMPLE: 1769676

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1000	100	80-120	

SAMPLE DUPLICATE: 1769677

Parameter	Units	10278400001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	200	204	2	10	

SAMPLE DUPLICATE: 1769678

Parameter	Units	10278327004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	304	297	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

QC Batch: WET/37706 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

METHOD BLANK: 1769671 Matrix: Water
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	08/23/14 20:09	

LABORATORY CONTROL SAMPLE: 1769672

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	92.0	92	80-120	

SAMPLE DUPLICATE: 1769673

Parameter	Units	10278400001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	15.0	15.0	0	10	

SAMPLE DUPLICATE: 1769674

Parameter	Units	10278327004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	59.0	58.0	2	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

QC Batch: WETA/19918 Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

METHOD BLANK: 1774341 Matrix: Water
Associated Lab Samples: 10278295002, 10278295003, 10278295004, 10278295005, 10278295006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	08/29/14 16:56	

LABORATORY CONTROL SAMPLE: 1774342

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1774343 1774344

Parameter	Units	10278295002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.23	2.5	2.5	0.72	0.70	19	19	80-120	2	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1774345 1774346

Parameter	Units	10278400004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.78	2.5	2.5	2.8	2.9	79	86	80-120	6	30	M1

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10278295

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10278295001	**LAO-SS-1-081414**	EPA 200.8	MPRP/48425	EPA 200.8	ICPM/21458
10278295002	**LAO-SS-1-081814**	EPA 200.8	MPRP/48425	EPA 200.8	ICPM/21458
10278295003	**LAO-SS-2-081814**	EPA 200.8	MPRP/48425	EPA 200.8	ICPM/21458
10278295004	**LAO-SS-IT-081814**	EPA 200.8	MPRP/48425	EPA 200.8	ICPM/21458
10278295005	**LAO-SS-3-081814**	EPA 200.8	MPRP/48425	EPA 200.8	ICPM/21458
10278295006	**LAO-SS-4-081814**	EPA 200.8	MPRP/48425	EPA 200.8	ICPM/21458
10278295001	**LAO-SS-1-081414**	EPA 245.1	MERP/11477	EPA 245.1	MERC/13174
10278295002	**LAO-SS-1-081814**	EPA 245.1	MERP/11477	EPA 245.1	MERC/13174
10278295003	**LAO-SS-2-081814**	EPA 245.1	MERP/11477	EPA 245.1	MERC/13174
10278295004	**LAO-SS-IT-081814**	EPA 245.1	MERP/11477	EPA 245.1	MERC/13174
10278295005	**LAO-SS-3-081814**	EPA 245.1	MERP/11477	EPA 245.1	MERC/13174
10278295006	**LAO-SS-4-081814**	EPA 245.1	MERP/11477	EPA 245.1	MERC/13174
10278295002	**LAO-SS-1-081814**	SM 2320B	WET/37748		
10278295003	**LAO-SS-2-081814**	SM 2320B	WET/37748		
10278295004	**LAO-SS-IT-081814**	SM 2320B	WET/37748		
10278295005	**LAO-SS-3-081814**	SM 2320B	WET/37748		
10278295006	**LAO-SS-4-081814**	SM 2320B	WET/37748		
10278295002	**LAO-SS-1-081814**	SM 2540C	WET/37707		
10278295003	**LAO-SS-2-081814**	SM 2540C	WET/37707		
10278295004	**LAO-SS-IT-081814**	SM 2540C	WET/37707		
10278295005	**LAO-SS-3-081814**	SM 2540C	WET/37707		
10278295006	**LAO-SS-4-081814**	SM 2540C	WET/37707		
10278295002	**LAO-SS-1-081814**	SM 2540D	WET/37706		
10278295003	**LAO-SS-2-081814**	SM 2540D	WET/37706		
10278295004	**LAO-SS-IT-081814**	SM 2540D	WET/37706		
10278295005	**LAO-SS-3-081814**	SM 2540D	WET/37706		
10278295006	**LAO-SS-4-081814**	SM 2540D	WET/37706		
10278295002	**LAO-SS-1-081814**	SM 4500-NO3 H	WETA/19918		
10278295003	**LAO-SS-2-081814**	SM 4500-NO3 H	WETA/19918		
10278295004	**LAO-SS-IT-081814**	SM 4500-NO3 H	WETA/19918		
10278295005	**LAO-SS-3-081814**	SM 4500-NO3 H	WETA/19918		
10278295006	**LAO-SS-4-081814**	SM 4500-NO3 H	WETA/19918		

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10278295

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap Tim Hilmo

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate/Nitrite	TDS/TSS/Alkalinity					Comments
	LAO-SS-1 ~~081414~~	8/14/14	1200		X			2			2				X			X								001
	LAO-SS-1 -081814	8/18/14	1040		X			4	1	1	2				X			X	X	X						002
	LAO-SS-2 -081814	8/18/14	12:15		X			3	1	1	1				X			X	X	X						003
	LAO-SS-1T-081814	8/18/14	10:40		X			3	1	1	1				X				X	X						004
	LAO-SS-3-081814	8/18/14	11:00		X			3	1	1	1				X				X	X						005
	LAO-SS-4-081814	8/18/14	12:20		X			3	1	1	1				X				X	X						006

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: D Pace, T Hickey						
Sampler's Company: Pioneer Technical Services	Thomas Hickey / PTS	8/18/14	12:45	D Pace	8/18/14	1150
Shipment Method: FedEx Ship Date: 8/18/14						
Shipment Tracking No: 5540 9201 8420						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (Yes circled) | Temp Blank: Yes / No (Yes circled) | Cooler Temp on Receipt: 3.0 °F/C | Trip Blank: Yes / No (No circled) | MS/MSD Sample Submitted: Yes / No (No circled)

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP-Pioneer Tech

Project #: WO#: 10278295

10278295

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9201 8420

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.0 **Cooler Temp Corrected (°C):** 3.0 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** 8/19/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☒ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 2-6 1/1 3-6 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1614	Temp: 3.0	Corrected Temp:
Time: 1421	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 8/20/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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September 11, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on August 26, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10279209001	**LAO-SS-1-082114**	Water	08/21/14 10:00	08/26/14 10:00
10279209002	**LAO-SS-1-082514**	Water	08/25/14 11:30	08/26/14 10:00
10279209003	**LAO-SS-2-082514**	Water	08/25/14 12:20	08/26/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10279209001	**LAO-SS-1-082114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10279209002	**LAO-SS-1-082514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10279209003	**LAO-SS-2-082514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 11, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/48703

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10279101015

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1778566)
  - Aluminum
  - Calcium
- MSD (Lab ID: 1778567)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 11, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Sample: LAO-SS-1-082114 **Lab ID: 10279209001** Collected: 08/21/14 10:00 Received: 08/26/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0083J**	mg/L	0.010	0.0012	1	09/05/14 14:27	09/09/14 20:45	7429-90-5	
Arsenic	**0.0037**	mg/L	0.00050	0.00025	1	09/05/14 14:27	09/09/14 20:45	7440-38-2	
Cadmium	**0.00012**	mg/L	0.000080	0.000033	1	09/05/14 14:27	09/09/14 20:45	7440-43-9	
Calcium	**102**	mg/L	0.40	0.084	10	09/05/14 14:27	09/10/14 14:29	7440-70-2	
Copper	**0.0077**	mg/L	0.0010	0.00022	1	09/05/14 14:27	09/09/14 20:45	7440-50-8	
Iron	**0.018J**	mg/L	0.050	0.0080	1	09/05/14 14:27	09/09/14 20:45	7439-89-6	
Lead	**0.00043**	mg/L	0.00010	0.000046	1	09/05/14 14:27	09/09/14 20:45	7439-92-1	
Magnesium	**23.9**	mg/L	0.10	0.028	10	09/05/14 14:27	09/10/14 14:29	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/05/14 14:27	09/09/14 20:45	7440-22-4	
Total Hardness by 2340B	**353**	mg/L	0.71	0.36	10	09/05/14 14:27	09/10/14 14:29		
Uranium-238	**0.00071**	mg/L	0.00050	0.00025	1	09/05/14 14:27	09/10/14 14:25	7440-61-1	
Zinc	**0.022**	mg/L	0.0050	0.0025	1	09/05/14 14:27	09/09/14 20:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/08/14 13:04	09/08/14 16:50	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Sample: LAO-SS-1-082514 **Lab ID: 10279209002** Collected: 08/25/14 11:30 Received: 08/26/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.015**	mg/L	0.010	0.0012	1	09/05/14 14:27	09/09/14 20:49	7429-90-5	
Arsenic	**0.0033**	mg/L	0.00050	0.00025	1	09/05/14 14:27	09/09/14 20:49	7440-38-2	
Cadmium	**0.00012**	mg/L	0.000080	0.000033	1	09/05/14 14:27	09/09/14 20:49	7440-43-9	
Calcium	**99.6**	mg/L	0.40	0.084	10	09/05/14 14:27	09/10/14 14:38	7440-70-2	
Copper	**0.0072**	mg/L	0.0010	0.00022	1	09/05/14 14:27	09/09/14 20:49	7440-50-8	
Iron	**0.023J**	mg/L	0.050	0.0080	1	09/05/14 14:27	09/09/14 20:49	7439-89-6	
Lead	**0.00044**	mg/L	0.00010	0.000046	1	09/05/14 14:27	09/09/14 20:49	7439-92-1	
Magnesium	**25.0**	mg/L	0.10	0.028	10	09/05/14 14:27	09/10/14 14:38	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/05/14 14:27	09/09/14 20:49	7440-22-4	
Total Hardness by 2340B	**352**	mg/L	0.71	0.36	10	09/05/14 14:27	09/10/14 14:38		
Uranium-238	**0.0011**	mg/L	0.00050	0.00025	1	09/05/14 14:27	09/10/14 14:34	7440-61-1	
Zinc	**0.021**	mg/L	0.0050	0.0025	1	09/05/14 14:27	09/09/14 20:49	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/08/14 13:04	09/08/14 16:52	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Sample: LAO-SS-2-082514 **Lab ID: 10279209003** Collected: 08/25/14 12:20 Received: 08/26/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.095**	mg/L	0.010	0.0012	1	09/05/14 14:27	09/09/14 20:54	7429-90-5	
Arsenic	**0.041**	mg/L	0.00050	0.00025	1	09/05/14 14:27	09/09/14 20:54	7440-38-2	
Cadmium	**0.023**	mg/L	0.000080	0.000033	1	09/05/14 14:27	09/09/14 20:54	7440-43-9	
Calcium	**125**	mg/L	0.80	0.17	20	09/05/14 14:27	09/10/14 14:47	7440-70-2	
Copper	**0.70**	mg/L	0.0050	0.0011	5	09/05/14 14:27	09/09/14 20:58	7440-50-8	
Iron	**2.4**	mg/L	0.050	0.0080	1	09/05/14 14:27	09/09/14 20:54	7439-89-6	
Lead	**0.0036**	mg/L	0.00010	0.000046	1	09/05/14 14:27	09/09/14 20:54	7439-92-1	
Magnesium	**31.2**	mg/L	0.050	0.014	5	09/05/14 14:27	09/09/14 20:58	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/05/14 14:27	09/09/14 20:54	7440-22-4	
Total Hardness by 2340B	**441**	mg/L	1.4	0.71	20	09/05/14 14:27	09/10/14 14:47		
Uranium-238	**0.0099**	mg/L	0.00050	0.00025	1	09/05/14 14:27	09/10/14 14:43	7440-61-1	
Zinc	**5.3**	mg/L	0.10	0.050	20	09/05/14 14:27	09/10/14 14:47	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/08/14 13:04	09/08/14 17:02	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

QC Batch: MERP/11556 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10279209001, 10279209002, 10279209003

METHOD BLANK: 1779105 Matrix: Water
Associated Lab Samples: 10279209001, 10279209002, 10279209003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/08/14 16:43	

LABORATORY CONTROL SAMPLE: 1779106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1779107 1779108

Parameter	Units	10279209002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0047	0.0045	95	90	70-130	5	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

QC Batch: MPRP/48703 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10279209001, 10279209002, 10279209003

METHOD BLANK: 1778564 Matrix: Water
Associated Lab Samples: 10279209001, 10279209002, 10279209003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0012J	0.010	09/09/14 19:34	
Arsenic	mg/L	ND	0.00050	09/09/14 19:34	
Cadmium	mg/L	ND	0.000080	09/09/14 19:34	
Calcium	mg/L	0.0086J	0.040	09/09/14 19:34	
Copper	mg/L	ND	0.0010	09/09/14 19:34	
Iron	mg/L	ND	0.050	09/09/14 19:34	
Lead	mg/L	ND	0.00010	09/09/14 19:34	
Magnesium	mg/L	ND	0.010	09/09/14 19:34	
Silver	mg/L	ND	0.00050	09/09/14 19:34	
Uranium-238	mg/L	ND	0.00050	09/10/14 13:18	
Zinc	mg/L	ND	0.0050	09/09/14 19:34	

LABORATORY CONTROL SAMPLE: 1778565

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.081	102	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	0.93	93	85-115	
Copper	mg/L	.08	0.082	103	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.081	101	85-115	
Magnesium	mg/L	1	0.99	99	85-115	
Silver	mg/L	.08	0.082	102	85-115	
Uranium-238	mg/L	.08	0.074	93	85-115	
Zinc	mg/L	.08	0.072	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1778566 1778567

Parameter	Units	10279101015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	106 ug/L	.08	.08	0.22	0.21	137	128	70-130	3	20	M1
Arsenic	mg/L	2.7 ug/L	.08	.08	0.079	0.082	95	99	70-130	4	20	
Cadmium	mg/L	0.038J ug/L	.08	.08	0.079	0.073	99	92	70-130	8	20	
Calcium	mg/L	28300 ug/L	1	1	30.3	30.4	206	208	70-130	.07	20	M1
Copper	mg/L	2.0 ug/L	.08	.08	0.084	0.077	102	94	70-130	8	20	
Iron	mg/L	77.4 ug/L	1	1	1.1	1.0	99	93	70-130	7	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1778566 1778567

Parameter	Units	10279101015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.33 ug/L	.08	.08	0.081	0.075	101	93	70-130	8	20	
Magnesium	mg/L	6410 ug/L	1	1	7.4	7.3	95	93	70-130	.3	20	
Silver	mg/L	0.098J ug/L	.08	.08	0.081	0.075	101	93	70-130	8	20	
Uranium-238	mg/L	ND	.08	.08	0.076	0.070	95	87	70-130	8	20	
Zinc	mg/L	2.8J ug/L	.08	.08	0.076	0.076	92	91	70-130	.6	20	

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QUALIFIERS

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO WETLANDS (WEEKLY)
Pace Project No.: 10279209

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10279209001	**LAO-SS-1-082114**	EPA 200.8	MPRP/48703	EPA 200.8	ICPM/21557
10279209002	**LAO-SS-1-082514**	EPA 200.8	MPRP/48703	EPA 200.8	ICPM/21557
10279209003	**LAO-SS-2-082514**	EPA 200.8	MPRP/48703	EPA 200.8	ICPM/21557
10279209001	**LAO-SS-1-082114**	EPA 245.1	MERP/11556	EPA 245.1	MERC/13299
10279209002	**LAO-SS-1-082514**	EPA 245.1	MERP/11556	EPA 245.1	MERC/13299
10279209003	**LAO-SS-2-082514**	EPA 245.1	MERP/11556	EPA 245.1	MERC/13299

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10279209

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Acct:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Tim Holmo

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 -082114	8/21/14	10:00		X						2			X			X	001
	LAO-SS-1 -082514	8/25/14	11:30		X						2			X			X	002
	LAO-SS-2 -082514	8/25/14	12:20		X						1			X				003

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: B. Hollamon, T. Hickey

Sampler's Company: Pioneer Technical Services

Shipment Method: Fed Ex Ship Date: 8/25/14

Shipment Tracking No: 5540 9201 8430

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / PTS	8/25/14	1430	[signature] Pace	8/26/14	1000

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 28Feb2014 Page 1 of 1
	Document No.: **F-MN-L-213-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: BP - PioneerTech

Project #: WO#: 10279209 (10279209)

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9201 8430

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.3 **Cooler Temp Corrected (°C):** 2.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** DRL 8/28/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12. 3-1/1
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 2/2 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1-2
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☒ No		Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Date: 8/28/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

September 23, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 03, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10279969001	**LAO-SS-1-082814**	Water	08/28/14 13:30	09/03/14 10:30
10279969002	**LAO-SS-1-090114**	Water	09/01/14 08:46	09/03/14 10:30
10279969003	**LAO-SS-2-090114**	Water	09/01/14 09:20	09/03/14 10:30

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10279969001	**LAO-SS-1-082814**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10279969002	**LAO-SS-1-090114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M
10279969003	**LAO-SS-2-090114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	WBS	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 23, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/48897

B: Analyte was detected in the associated method blank.

- BLANK for HBN 317185 [MPRP/488 (Lab ID: 1783868)
  - Aluminum

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/48897

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10279969001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1783870)
  - Calcium
- MSD (Lab ID: 1783871)
  - Calcium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 23, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Sample: LAO-SS-1-082814 **Lab ID: 10279969001** Collected: 08/28/14 13:30 Received: 09/03/14 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.023**	mg/L	0.010	0.0012	1	09/14/14 10:10	09/16/14 10:12	7429-90-5	
Arsenic	**0.0030**	mg/L	0.00050	0.00025	1	09/14/14 10:10	09/16/14 10:12	7440-38-2	
Cadmium	**0.000054J**	mg/L	0.000080	0.000033	1	09/14/14 10:10	09/16/14 10:12	7440-43-9	
Calcium	**107**	mg/L	0.80	0.17	20	09/14/14 10:10	09/16/14 10:29	7440-70-2	M1
Copper	**0.0030**	mg/L	0.0010	0.00022	1	09/14/14 10:10	09/16/14 10:12	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	09/14/14 10:10	09/16/14 10:12	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	09/14/14 10:10	09/16/14 10:12	7439-92-1	
Magnesium	**25.7**	mg/L	0.20	0.057	20	09/14/14 10:10	09/16/14 10:29	7439-95-4	
Silver	**0.00012J**	mg/L	0.00050	0.000056	1	09/14/14 10:10	09/16/14 10:12	7440-22-4	
Total Hardness by 2340B	**374**	mg/L	1.4	0.71	20	09/14/14 10:10	09/16/14 10:29		
Uranium-238	**0.0010**	mg/L	0.00050	0.00025	1	09/14/14 10:10	09/16/14 10:12	7440-61-1	
Zinc	**0.0036J**	mg/L	0.0050	0.0025	1	09/14/14 10:10	09/16/14 10:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/08/14 13:04	09/08/14 17:04	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Sample: LAO-SS-1-090114 **Lab ID: 10279969002** Collected: 09/01/14 08:46 Received: 09/03/14 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0027J**	mg/L	0.010	0.0012	1	09/14/14 10:10	09/16/14 10:37	7429-90-5	B
Arsenic	**0.0028**	mg/L	0.00050	0.00025	1	09/14/14 10:10	09/16/14 10:37	7440-38-2	
Cadmium	**0.000052J**	mg/L	0.000080	0.000033	1	09/14/14 10:10	09/16/14 10:37	7440-43-9	
Calcium	**106**	mg/L	0.80	0.17	20	09/14/14 10:10	09/16/14 10:40	7440-70-2	
Copper	**0.0024**	mg/L	0.0010	0.00022	1	09/14/14 10:10	09/16/14 10:37	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	09/14/14 10:10	09/16/14 10:37	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	09/14/14 10:10	09/16/14 10:37	7439-92-1	
Magnesium	**26.2**	mg/L	0.20	0.057	20	09/14/14 10:10	09/16/14 10:40	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/14/14 10:10	09/16/14 10:37	7440-22-4	
Total Hardness by 2340B	**373**	mg/L	1.4	0.71	20	09/14/14 10:10	09/16/14 10:40		
Uranium-238	**0.0010**	mg/L	0.00050	0.00025	1	09/14/14 10:10	09/16/14 10:37	7440-61-1	
Zinc	**0.0043J**	mg/L	0.0050	0.0025	1	09/14/14 10:10	09/16/14 10:37	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/08/14 13:04	09/08/14 17:06	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Sample: LAO-SS-2-090114 **Lab ID: 10279969003** Collected: 09/01/14 09:20 Received: 09/03/14 10:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.046**	mg/L	0.010	0.0012	1	09/14/14 10:10	09/16/14 10:43	7429-90-5	
Arsenic	**0.019**	mg/L	0.00050	0.00025	1	09/14/14 10:10	09/16/14 10:43	7440-38-2	
Cadmium	**0.018**	mg/L	0.000080	0.000033	1	09/14/14 10:10	09/16/14 10:43	7440-43-9	
Calcium	**136**	mg/L	0.80	0.17	20	09/14/14 10:10	09/16/14 10:45	7440-70-2	
Copper	**0.47**	mg/L	0.020	0.0043	20	09/14/14 10:10	09/16/14 10:45	7440-50-8	
Iron	**1.7**	mg/L	0.050	0.0080	1	09/14/14 10:10	09/16/14 10:43	7439-89-6	
Lead	**0.0018**	mg/L	0.00010	0.000046	1	09/14/14 10:10	09/16/14 10:43	7439-92-1	
Magnesium	**35.1**	mg/L	0.20	0.057	20	09/14/14 10:10	09/16/14 10:45	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/14/14 10:10	09/16/14 10:43	7440-22-4	
Total Hardness by 2340B	**483**	mg/L	1.4	0.71	20	09/14/14 10:10	09/16/14 10:45		
Uranium-238	**0.010**	mg/L	0.00050	0.00025	1	09/14/14 10:10	09/16/14 10:43	7440-61-1	
Zinc	**5.4**	mg/L	0.10	0.050	20	09/14/14 10:10	09/16/14 10:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/08/14 13:04	09/08/14 17:08	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

QC Batch: MERP/11556 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10279969001, 10279969002, 10279969003

METHOD BLANK: 1779105 Matrix: Water
Associated Lab Samples: 10279969001, 10279969002, 10279969003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/08/14 16:43	

LABORATORY CONTROL SAMPLE: 1779106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1779107 1779108

Parameter	Units	10279209002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0047	0.0045	95	90	70-130	5	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

QC Batch: MPRP/48897 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10279969001, 10279969002, 10279969003

METHOD BLANK: 1783868 Matrix: Water
Associated Lab Samples: 10279969001, 10279969002, 10279969003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0012J	0.010	09/16/14 09:53	
Arsenic	mg/L	ND	0.00050	09/16/14 09:53	
Cadmium	mg/L	ND	0.000080	09/16/14 09:53	
Calcium	mg/L	ND	0.040	09/16/14 09:53	
Copper	mg/L	ND	0.0010	09/16/14 09:53	
Iron	mg/L	ND	0.050	09/16/14 09:53	
Lead	mg/L	ND	0.00010	09/16/14 09:53	
Magnesium	mg/L	ND	0.010	09/16/14 09:53	
Silver	mg/L	ND	0.00050	09/16/14 09:53	
Uranium-238	mg/L	ND	0.00050	09/16/14 09:53	
Zinc	mg/L	ND	0.0050	09/16/14 09:53	

LABORATORY CONTROL SAMPLE: 1783869

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.083	103	85-115	
Cadmium	mg/L	.08	0.077	96	85-115	
Calcium	mg/L	1	1.0	101	85-115	
Copper	mg/L	.08	0.082	102	85-115	
Iron	mg/L	1	1.1	107	85-115	
Lead	mg/L	.08	0.084	105	85-115	
Magnesium	mg/L	1	1.0	100	85-115	
Silver	mg/L	.08	0.085	106	85-115	
Uranium-238	mg/L	.08	0.087	109	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1783870 1783871

Parameter	Units	10279969001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.023	.08	.08	0.11	0.10	104	101	70-130	2	20	
Arsenic	mg/L	0.0030	.08	.08	0.085	0.084	103	102	70-130	.8	20	
Cadmium	mg/L	0.000054J	.08	.08	0.077	0.075	96	93	70-130	4	20	
Calcium	mg/L	107	1	1	103	102	-424	-559	70-130	1	20	M1
Copper	mg/L	0.0030	.08	.08	0.081	0.079	98	96	70-130	2	20	
Iron	mg/L	ND	1	1	1.1	1.1	110	106	70-130	4	20	
Lead	mg/L	ND	.08	.08	0.080	0.078	100	97	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1783870 1783871

Parameter	Units	10279969001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	25.7	1	1	27.0	26.6	125	87	70-130	1	20	
Silver	mg/L	0.00012J	.08	.08	0.076	0.074	95	92	70-130	3	20	
Uranium-238	mg/L	0.0010	.08	.08	0.089	0.084	110	104	70-130	6	20	
Zinc	mg/L	0.0036J	.08	.08	0.086	0.083	103	99	70-130	4	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10279969

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10279969001	**LAO-SS-1-082814**	EPA 200.8	MPRP/48897	EPA 200.8	ICPM/21703
10279969002	**LAO-SS-1-090114**	EPA 200.8	MPRP/48897	EPA 200.8	ICPM/21703
10279969003	**LAO-SS-2-090114**	EPA 200.8	MPRP/48897	EPA 200.8	ICPM/21703
10279969001	**LAO-SS-1-082814**	EPA 245.1	MERP/11556	EPA 245.1	MERC/13299
10279969002	**LAO-SS-1-090114**	EPA 245.1	MERP/11556	EPA 245.1	MERC/13299
10279969003	**LAO-SS-2-090114**	EPA 245.1	MERP/11556	EPA 245.1	MERC/13299

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Laboratory Management Program LaMP Chain of Custody Record

bp rm

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10279969

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap / Tim Hilmes

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1 - 082814	8/28/14	13:30		X			2			2				X	X	
	LAO-SS-1 - 090114	9/1/14	8:46		X			2			2				X	X	
	LAO-SS-2 - 090114	9/1/14	9:20		X			1			1				X		

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: D Renz, T. Hickey						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	9/2/14	12:00	[signature] PMCO	9/3/14	1030
Shipment Method: Fed Ex Ship Date: 9/2/14						
Shipment Tracking No: ~~5540 9200 4526~~	5540 9200 5809					

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 5.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO#: 10279969

10279969

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 554009200 5809

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.7 **Cooler Temp Corrected (°C):** 5.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.5 **Date and Initials of Person Examining Contents:** 9/3/14 BD

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. 2/2 ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1606	Temp: 4.7	Corrected Temp: 5.2	
Time: 1610	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: CL **Date:** 9/4/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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September 30, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 09, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10280723001	**LAO-SS-1-090414**	Water	09/04/14 11:38	09/09/14 09:45
10280723002	**LAO-SS-1-090814**	Water	09/08/14 14:00	09/09/14 09:45
10280723003	**LAO-SS-2-090814**	Water	09/08/14 15:00	09/09/14 09:45

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10280723001	**LAO-SS-1-090414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10280723002	**LAO-SS-1-090814**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10280723003	**LAO-SS-2-090814**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 30, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/48956

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10280870001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1786395)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1786396)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: September 30, 2014

Analyte Comments:

QC Batch: MPRP/48956

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1786395)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1786396)
  - Calcium
  - Magnesium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: September 30, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Sample: LAO-SS-1-090414 **Lab ID: 10280723001** Collected: 09/04/14 11:38 Received: 09/09/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.018**	mg/L	0.010	0.0012	1	09/15/14 08:55	09/17/14 16:08	7429-90-5	
Arsenic	**0.0033**	mg/L	0.00050	0.00025	1	09/15/14 08:55	09/17/14 16:08	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	09/15/14 08:55	09/17/14 16:08	7440-43-9	
Calcium	**108**	mg/L	0.40	0.084	10	09/15/14 08:55	09/17/14 16:13	7440-70-2	
Copper	**0.012**	mg/L	0.0010	0.00022	1	09/15/14 08:55	09/17/14 16:08	7440-50-8	
Iron	**0.036J**	mg/L	0.050	0.0080	1	09/15/14 08:55	09/17/14 16:08	7439-89-6	
Lead	**0.0011**	mg/L	0.00010	0.000046	1	09/15/14 08:55	09/17/14 16:08	7439-92-1	
Magnesium	**27.6**	mg/L	0.10	0.028	10	09/15/14 08:55	09/17/14 16:13	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/15/14 08:55	09/17/14 16:08	7440-22-4	
Total Hardness by 2340B	**383**	mg/L	0.71	0.36	10	09/15/14 08:55	09/17/14 16:13		
Uranium-238	**0.0015**	mg/L	0.00050	0.00025	1	09/15/14 08:55	09/17/14 16:08	7440-61-1	
Zinc	**0.036**	mg/L	0.0050	0.0025	1	09/15/14 08:55	09/17/14 16:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/19/14 12:01	09/19/14 13:44	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Sample: LAO-SS-1-090814 **Lab ID: 10280723002** Collected: 09/08/14 14:00 Received: 09/09/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0042J**	mg/L	0.010	0.0012	1	09/15/14 08:55	09/17/14 16:17	7429-90-5	
Arsenic	**0.0031**	mg/L	0.00050	0.00025	1	09/15/14 08:55	09/17/14 16:17	7440-38-2	
Cadmium	**0.000049J**	mg/L	0.000080	0.000033	1	09/15/14 08:55	09/17/14 16:17	7440-43-9	
Calcium	**105**	mg/L	0.40	0.084	10	09/15/14 08:55	09/17/14 16:22	7440-70-2	
Copper	**0.0031**	mg/L	0.0010	0.00022	1	09/15/14 08:55	09/17/14 16:17	7440-50-8	
Iron	**0.058**	mg/L	0.050	0.0080	1	09/15/14 08:55	09/17/14 16:17	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	09/15/14 08:55	09/17/14 16:17	7439-92-1	
Magnesium	**26.9**	mg/L	0.10	0.028	10	09/15/14 08:55	09/17/14 16:22	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/15/14 08:55	09/17/14 16:17	7440-22-4	
Total Hardness by 2340B	**373**	mg/L	0.71	0.36	10	09/15/14 08:55	09/17/14 16:22		
Uranium-238	**0.0016**	mg/L	0.00050	0.00025	1	09/15/14 08:55	09/17/14 16:17	7440-61-1	
Zinc	**0.0033J**	mg/L	0.0050	0.0025	1	09/15/14 08:55	09/17/14 16:17	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/19/14 12:01	09/19/14 13:47	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Sample: LAO-SS-2-090814 **Lab ID: 10280723003** Collected: 09/08/14 15:00 Received: 09/09/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.032**	mg/L	0.010	0.0012	1	09/15/14 08:55	09/17/14 16:27	7429-90-5	
Arsenic	**0.017**	mg/L	0.00050	0.00025	1	09/15/14 08:55	09/17/14 16:27	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	09/15/14 08:55	09/17/14 16:27	7440-43-9	
Calcium	**136**	mg/L	0.80	0.17	20	09/15/14 08:55	09/17/14 16:32	7440-70-2	
Copper	**0.39**	mg/L	0.0010	0.00022	1	09/15/14 08:55	09/17/14 16:27	7440-50-8	
Iron	**1.5**	mg/L	0.050	0.0080	1	09/15/14 08:55	09/17/14 16:27	7439-89-6	
Lead	**0.0014**	mg/L	0.00010	0.000046	1	09/15/14 08:55	09/17/14 16:27	7439-92-1	
Magnesium	**34.2**	mg/L	0.20	0.057	20	09/15/14 08:55	09/17/14 16:32	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/15/14 08:55	09/17/14 16:27	7440-22-4	
Total Hardness by 2340B	**480**	mg/L	1.4	0.71	20	09/15/14 08:55	09/17/14 16:32		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	09/15/14 08:55	09/17/14 16:27	7440-61-1	
Zinc	**5.6**	mg/L	0.10	0.050	20	09/15/14 08:55	09/17/14 16:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/19/14 12:01	09/19/14 13:58	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

QC Batch: MERP/11667 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10280723001, 10280723002, 10280723003

METHOD BLANK: 1792321 Matrix: Water
Associated Lab Samples: 10280723001, 10280723002, 10280723003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/19/14 13:39	

LABORATORY CONTROL SAMPLE: 1792322

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1792323 1792324

Parameter	Units	10280723003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0050	0.0051	100	102	70-130	1	20	

MATRIX SPIKE SAMPLE: 1792325

Parameter	Units	10281528001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0047	94	70-130	

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REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

QC Batch: MPRP/48956 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10280723001, 10280723002, 10280723003

METHOD BLANK: 1786393 Matrix: Water
Associated Lab Samples: 10280723001, 10280723002, 10280723003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	09/17/14 15:15	
Arsenic	mg/L	ND	0.00050	09/17/14 15:15	
Cadmium	mg/L	ND	0.000080	09/17/14 15:15	
Calcium	mg/L	0.012J	0.040	09/17/14 15:15	
Copper	mg/L	ND	0.0010	09/17/14 15:15	
Iron	mg/L	ND	0.050	09/17/14 15:15	
Lead	mg/L	ND	0.00010	09/17/14 15:15	
Magnesium	mg/L	0.0046J	0.010	09/17/14 15:15	
Silver	mg/L	ND	0.00050	09/17/14 15:15	
Uranium-238	mg/L	ND	0.00050	09/17/14 15:15	
Zinc	mg/L	ND	0.0050	09/17/14 15:15	

LABORATORY CONTROL SAMPLE: 1786394

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	104	85-115	
Arsenic	mg/L	.08	0.080	101	85-115	
Cadmium	mg/L	.08	0.081	101	85-115	
Calcium	mg/L	1	1.0	104	85-115	
Copper	mg/L	.08	0.079	99	85-115	
Iron	mg/L	1	1.0	102	85-115	
Lead	mg/L	.08	0.081	101	85-115	
Magnesium	mg/L	1	0.99	99	85-115	
Silver	mg/L	.08	0.081	102	85-115	
Uranium-238	mg/L	.08	0.082	102	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1786395 1786396

Parameter	Units	10280870001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	30.7 ug/L	.08	.08	0.11	0.12	99	108	70-130	6	20	
Arsenic	mg/L	0.52 ug/L	.08	.08	0.086	0.086	106	107	70-130	1	20	
Cadmium	mg/L	0.16 ug/L	.08	.08	0.077	0.077	96	96	70-130	0	20	
Calcium	mg/L	880000 ug/L	1	1	954	953	7430	7330	70-130	0	20	E,M1
Copper	mg/L	ND	.08	.08	0.076	0.076	95	95	70-130	0	20	
Iron	mg/L	ND	1	1	1.0	1.0	99	101	70-130	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1786395 1786396

Parameter	Units	10280870001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.41 ug/L	.08	.08	0.075	0.075	93	93	70-130	0	20	
Magnesium	mg/L	107000 ug/L	1	1	107	106	-9	-91	70-130	1	20	E,M1
Silver	mg/L	ND	.08	.08	0.076	0.075	95	94	70-130	0	20	
Uranium-238	mg/L	ND	.08	.08	0.081	0.081	101	101	70-130	0	20	
Zinc	mg/L	70.7 ug/L	.08	.08	0.15	0.15	97	96	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10280723

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10280723001	**LAO-SS-1-090414**	EPA 200.8	MPRP/48956	EPA 200.8	ICPM/21719
10280723002	**LAO-SS-1-090814**	EPA 200.8	MPRP/48956	EPA 200.8	ICPM/21719
10280723003	**LAO-SS-2-090814**	EPA 200.8	MPRP/48956	EPA 200.8	ICPM/21719
10280723001	**LAO-SS-1-090414**	EPA 245.1	MERP/11667	EPA 245.1	MERC/13451
10280723002	**LAO-SS-1-090814**	EPA 245.1	MERP/11667	EPA 245.1	MERC/13451
10280723003	**LAO-SS-2-090814**	EPA 245.1	MERP/11667	EPA 245.1	MERC/13451

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils
Req Due Date (mm/dd/yy): 9/22/14
Rush TAT: Yes ____ No x
BP Facility No: LAO Wetlands (Weekly)
Lab Work Order Number: 10280723

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap
BP PM Phone: 406-782-9964
BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments
	LAO-SS-1-090414	9/4/14	1138		X			2			2				X	X	10280723 001
	LAO-SS-1-090814	9/8/14	1400		X			2			2				X	X	002
	LAO-SS-2-090814	9/8/14	1500		X			1			1				X		003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Brad Hollamon						
Sampler's Company: Pioneer Technical Services	Brad Hollamon / PTS	9/8/14	1520	[illegible] PCKP	9/9/14	0945
Shipment Method: FedEx Ship Date: 9/8/14						
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No (No) | Temp Blank: Yes / No (No) | Cooler Temp on Receipt: 3.4 °F/C | Trip Blank: Yes / No (No) | MS/MSD Sample Submitted: Yes / No (No)

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer Tech

Project #: WO#: 10280723

10280723

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other: _____

Tracking Number: 5540 9200 5007

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: _____ **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.9 **Cooler Temp Corrected (°C):** 3.4 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.5 **Date and Initials of Person Examining Contents:** 09/09/14 BD

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. 2/2 ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1740	Temp: 2.9	Corrected Temp: 3.4
Time: 1745	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: Chr **Date:** 9/10/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

October 01, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 16, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10281591001	**LAO-SS-1-091114**	Water	09/11/14 10:45	09/16/14 10:10
10281591002	**LAO-SS-1-091514**	Water	09/15/14 11:36	09/16/14 10:10
10281591003	**LAO-SS-2-091514**	Water	09/15/14 12:40	09/16/14 10:10
10281591004	**LAO-SS-2T-091514**	Water	09/15/14 12:40	09/16/14 10:10
10281591005	**LAO-SS-3-091514**	Water	09/15/14 12:05	09/16/14 10:10
10281591006	**LAO-SS-4-091514**	Water	09/15/14 13:00	09/16/14 10:10

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10281591001	**LAO-SS-1-091114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10281591002	**LAO-SS-1-091514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10281591003	**LAO-SS-2-091514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10281591004	**LAO-SS-2T-091514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10281591005	**LAO-SS-3-091514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10281591006	**LAO-SS-4-091514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	PH1	1	PASI-M
		SM 2540C	JFP	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 01, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/49145

B: Analyte was detected in the associated method blank.

- BLANK for HBN 318825 [MPRP/491 (Lab ID: 1792262)
  - Iron

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/49145

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10281591001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1792264)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1792265)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 01, 2014

Analyte Comments:

QC Batch: MPRP/49145

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1792264)
  - Calcium
- MSD (Lab ID: 1792265)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: October 01, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: October 01, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: October 01, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/38225

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: 1795107)
  - Total Dissolved Solids

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: October 01, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: October 01, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/20325

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10281226046,10281591003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1797036)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1797038)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1797037)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1797039)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Sample: LAO-SS-1-091114 **Lab ID: 10281591001** Collected: 09/11/14 10:45 Received: 09/16/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0049J**	mg/L	0.010	0.0012	1	09/26/14 11:05	09/29/14 22:46	7429-90-5	
Arsenic	**0.0034**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 22:46	7440-38-2	
Cadmium	**0.000090**	mg/L	0.000080	0.000033	1	09/26/14 11:05	09/29/14 22:46	7440-43-9	
Calcium	**110**	mg/L	0.40	0.084	10	09/26/14 11:05	09/29/14 23:11	7440-70-2	M1
Copper	**0.0065**	mg/L	0.0010	0.00022	1	09/26/14 11:05	09/29/14 22:46	7440-50-8	
Iron	**0.015J**	mg/L	0.050	0.0080	1	09/26/14 11:05	09/29/14 22:46	7439-89-6	B
Lead	**0.00033**	mg/L	0.00010	0.000046	1	09/26/14 11:05	09/29/14 22:46	7439-92-1	
Magnesium	**29.6**	mg/L	0.10	0.028	10	09/26/14 11:05	09/29/14 23:11	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	09/26/14 11:05	09/29/14 22:46	7440-22-4	
Total Hardness by 2340B	**396**	mg/L	0.71	0.36	10	09/26/14 11:05	09/29/14 23:11		
Uranium-238	**0.0017**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 22:46	7440-61-1	
Zinc	**0.022**	mg/L	0.0050	0.0025	1	09/26/14 11:05	09/29/14 22:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 11:37	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Sample: LAO-SS-1-091514 **Lab ID: 10281591002** Collected: 09/15/14 11:36 Received: 09/16/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.027**	mg/L	0.010	0.0012	1	09/26/14 11:05	09/29/14 23:50	7429-90-5	
Arsenic	**0.0034**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 23:50	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	09/26/14 11:05	09/29/14 23:50	7440-43-9	
Calcium	**108**	mg/L	0.40	0.084	10	09/26/14 11:05	09/29/14 23:54	7440-70-2	
Copper	**0.011**	mg/L	0.0010	0.00022	1	09/26/14 11:05	09/29/14 23:50	7440-50-8	
Iron	**0.056**	mg/L	0.050	0.0080	1	09/26/14 11:05	09/29/14 23:50	7439-89-6	B
Lead	**0.0011**	mg/L	0.00010	0.000046	1	09/26/14 11:05	09/29/14 23:50	7439-92-1	
Magnesium	**29.6**	mg/L	0.10	0.028	10	09/26/14 11:05	09/29/14 23:54	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/26/14 11:05	09/29/14 23:50	7440-22-4	
Total Hardness by 2340B	**391**	mg/L	0.71	0.36	10	09/26/14 11:05	09/29/14 23:54		
Uranium-238	**0.0021**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 23:50	7440-61-1	
Zinc	**0.042**	mg/L	0.0050	0.0025	1	09/26/14 11:05	09/29/14 23:50	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 11:39	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**27.7**	mg/L	5.0	2.5	1		09/25/14 13:55		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**726**	mg/L	10.0	5.0	1		09/20/14 14:25		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/22/14 10:52		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.41**	mg/L	0.10	0.050	1		09/24/14 17:08		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Sample: LAO-SS-2-091514 **Lab ID: 10281591003** Collected: 09/15/14 12:40 Received: 09/16/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.046**	mg/L	0.010	0.0012	1	09/26/14 11:05	09/29/14 23:59	7429-90-5	
Arsenic	**0.020**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 23:59	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	09/26/14 11:05	09/29/14 23:59	7440-43-9	
Calcium	**130**	mg/L	0.80	0.17	20	09/26/14 11:05	09/30/14 00:04	7440-70-2	
Copper	**0.43**	mg/L	0.0010	0.00022	1	09/26/14 11:05	09/29/14 23:59	7440-50-8	
Iron	**1.7**	mg/L	0.050	0.0080	1	09/26/14 11:05	09/29/14 23:59	7439-89-6	
Lead	**0.0018**	mg/L	0.00010	0.000046	1	09/26/14 11:05	09/29/14 23:59	7439-92-1	
Magnesium	**34.4**	mg/L	0.20	0.057	20	09/26/14 11:05	09/30/14 00:04	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/26/14 11:05	09/29/14 23:59	7440-22-4	
Total Hardness by 2340B	**467**	mg/L	1.4	0.71	20	09/26/14 11:05	09/30/14 00:04		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 23:59	7440-61-1	
Zinc	**5.5**	mg/L	0.10	0.050	20	09/26/14 11:05	09/30/14 00:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 11:42	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**116**	mg/L	5.0	2.5	1		09/25/14 14:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**801**	mg/L	10.0	5.0	1		09/20/14 14:25		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**16.0**	mg/L	10.0	5.0	1		09/22/14 10:52		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.78**	mg/L	0.10	0.050	1		09/24/14 14:38		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Sample: LAO-SS-2T-091514 **Lab ID: 10281591004** Collected: 09/15/14 12:40 Received: 09/16/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.046**	mg/L	0.010	0.0012	1	09/26/14 11:05	09/30/14 00:09	7429-90-5	
Arsenic	**0.021**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/30/14 00:09	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	09/26/14 11:05	09/30/14 00:09	7440-43-9	
Calcium	**128**	mg/L	0.80	0.17	20	09/26/14 11:05	09/30/14 00:14	7440-70-2	
Copper	**0.44**	mg/L	0.0010	0.00022	1	09/26/14 11:05	09/30/14 00:09	7440-50-8	
Iron	**1.7**	mg/L	0.050	0.0080	1	09/26/14 11:05	09/30/14 00:09	7439-89-6	
Lead	**0.0018**	mg/L	0.00010	0.000046	1	09/26/14 11:05	09/30/14 00:09	7439-92-1	
Magnesium	**34.3**	mg/L	0.20	0.057	20	09/26/14 11:05	09/30/14 00:14	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/26/14 11:05	09/30/14 00:09	7440-22-4	
Total Hardness by 2340B	**461**	mg/L	1.4	0.71	20	09/26/14 11:05	09/30/14 00:14		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/30/14 00:09	7440-61-1	
Zinc	**5.6**	mg/L	0.10	0.050	20	09/26/14 11:05	09/30/14 00:14	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 11:54	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**116**	mg/L	5.0	2.5	1		09/25/14 14:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**806**	mg/L	10.0	5.0	1		09/20/14 14:25		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**13.0**	mg/L	10.0	5.0	1		09/22/14 10:52		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.80**	mg/L	0.10	0.050	1		09/24/14 14:42		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Sample: LAO-SS-3-091514 **Lab ID: 10281591005** Collected: 09/15/14 12:05 Received: 09/16/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.46**	mg/L	0.010	0.0012	1	09/26/14 11:05	09/30/14 00:18	7429-90-5	
Arsenic	**0.0043**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/30/14 00:18	7440-38-2	
Cadmium	**0.047**	mg/L	0.000080	0.000033	1	09/26/14 11:05	09/30/14 00:18	7440-43-9	
Calcium	**136**	mg/L	0.40	0.084	10	09/26/14 11:05	09/30/14 00:24	7440-70-2	
Copper	**3.4**	mg/L	0.010	0.0022	10	09/26/14 11:05	09/30/14 00:24	7440-50-8	
Iron	**12.1**	mg/L	0.050	0.0080	1	09/26/14 11:05	09/30/14 00:18	7439-89-6	
Lead	**0.0031**	mg/L	0.00010	0.000046	1	09/26/14 11:05	09/30/14 00:18	7439-92-1	
Magnesium	**36.0**	mg/L	0.10	0.028	10	09/26/14 11:05	09/30/14 00:24	7439-95-4	
Silver	**0.000073J**	mg/L	0.00050	0.000056	1	09/26/14 11:05	09/30/14 00:18	7440-22-4	
Total Hardness by 2340B	**487**	mg/L	0.71	0.36	10	09/26/14 11:05	09/30/14 00:24		
Uranium-238	**0.014**	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/30/14 00:18	7440-61-1	
Zinc	**9.9**	mg/L	0.50	0.25	100	09/26/14 11:05	09/30/14 00:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 11:56	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**71.5**	mg/L	5.0	2.5	1		09/25/14 14:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**878**	mg/L	10.0	5.0	1		09/20/14 14:25		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**37.0**	mg/L	10.0	5.0	1		09/22/14 10:52		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.9**	mg/L	0.10	0.050	1		09/24/14 14:43		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Sample: LAO-SS-4-091514 **Lab ID: 10281591006** Collected: 09/15/14 13:00 Received: 09/16/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.010	0.0012	1	09/26/14 11:05	09/29/14 23:45	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 23:45	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	09/26/14 11:05	09/29/14 23:45	7440-43-9	
Calcium	ND	mg/L	0.040	0.0084	1	09/26/14 11:05	09/29/14 23:45	7440-70-2	
Copper	**0.00030J**	mg/L	0.0010	0.00022	1	09/26/14 11:05	09/29/14 23:45	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	09/26/14 11:05	09/29/14 23:45	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	09/26/14 11:05	09/29/14 23:45	7439-92-1	
Magnesium	ND	mg/L	0.010	0.0028	1	09/26/14 11:05	09/29/14 23:45	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	09/26/14 11:05	09/29/14 23:45	7440-22-4	
Total Hardness by 2340B	ND	mg/L	0.071	0.036	1	09/26/14 11:05	09/29/14 23:45		
Uranium-238	ND	mg/L	0.00050	0.00025	1	09/26/14 11:05	09/29/14 23:45	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	09/26/14 11:05	09/29/14 23:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 11:59	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		09/25/14 16:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8.0J**	mg/L	10.0	5.0	1		09/20/14 14:25		D8
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		09/22/14 10:52		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/24/14 17:09		

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

QC Batch: MERP/11741 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10281591001, 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

METHOD BLANK: 1798697 Matrix: Water
Associated Lab Samples: 10281591001, 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/29/14 11:32	

LABORATORY CONTROL SAMPLE: 1798698

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1798699 1798700

Parameter	Units	10281591003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0048	97	96	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

QC Batch: MPRP/49145 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10281591001, 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

METHOD BLANK: 1792262 Matrix: Water
Associated Lab Samples: 10281591001, 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	09/29/14 22:41	
Arsenic	mg/L	ND	0.00050	09/29/14 22:41	
Cadmium	mg/L	ND	0.000080	09/29/14 22:41	
Calcium	mg/L	ND	0.040	09/29/14 22:41	
Copper	mg/L	ND	0.0010	09/29/14 22:41	
Iron	mg/L	0.019J	0.050	09/29/14 22:41	
Lead	mg/L	ND	0.00010	09/29/14 22:41	
Magnesium	mg/L	ND	0.010	09/29/14 22:41	
Silver	mg/L	ND	0.00050	09/29/14 22:41	
Uranium-238	mg/L	ND	0.00050	09/29/14 22:41	
Zinc	mg/L	ND	0.0050	09/29/14 22:41	

LABORATORY CONTROL SAMPLE: 1792263

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.082	103	85-115	
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.079	99	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.080	100	85-115	
Iron	mg/L	1	1.0	101	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.078	97	85-115	
Uranium-238	mg/L	.08	0.082	102	85-115	
Zinc	mg/L	.08	0.083	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1792264 1792265

Parameter	Units	10281591001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0049J	.08	.08	0.091	0.085	108	100	70-130	8	20	
Arsenic	mg/L	0.0034	.08	.08	0.083	0.083	100	100	70-130	0	20	
Cadmium	mg/L	0.000090	.08	.08	0.080	0.078	100	97	70-130	3	20	
Calcium	mg/L	110	1	1	106	105	-436	-460	70-130	0	20	E,M1
Copper	mg/L	0.0065	.08	.08	0.085	0.082	98	94	70-130	3	20	
Iron	mg/L	0.015J	1	1	1.0	1.0	100	99	70-130	1	20	
Lead	mg/L	0.00033	.08	.08	0.082	0.081	103	100	70-130	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1792264 1792265

Parameter	Units	10281591001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	29.6	1	1	28.9	28.6	-71	-95	70-130	1	20	M1
Silver	mg/L	ND	.08	.08	0.075	0.074	94	92	70-130	2	20	
Uranium-238	mg/L	0.0017	.08	.08	0.083	0.082	102	100	70-130	2	20	
Zinc	mg/L	0.022	.08	.08	0.10	0.10	99	97	70-130	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

QC Batch: WET/38304 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

METHOD BLANK: 1798443 Matrix: Water
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	09/25/14 11:39	

LABORATORY CONTROL SAMPLE & LCSD: 1798444 1798445

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	41.5	41.6	104	104	90-110	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1798446 1798447

Parameter	Units	10281880002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	194	40	40	235	235	103	103	80-120	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1798448 1798449

Parameter	Units	10281591002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	27.7	40	40	66.6	67.1	97	98	80-120	1	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

QC Batch: WET/38225 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

METHOD BLANK: 1795104 Matrix: Water
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	09/20/14 14:25	

LABORATORY CONTROL SAMPLE: 1795105

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1080	108	80-120	

SAMPLE DUPLICATE: 1795106

Parameter	Units	10281521016 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	259	260	0	10	

SAMPLE DUPLICATE: 1795107

Parameter	Units	10281591006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	8.0J	13.0		10	D8

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

QC Batch: WET/38235 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

METHOD BLANK: 1795452 Matrix: Water
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	09/22/14 10:52	

LABORATORY CONTROL SAMPLE: 1795453

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	96.0	96	80-120	

SAMPLE DUPLICATE: 1795454

Parameter	Units	10281947001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	93.0	85.0	9	10	H3

SAMPLE DUPLICATE: 1795455

Parameter	Units	10281591002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

QC Batch: WETA/20325 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

METHOD BLANK: 1797034 | Matrix: Water
Associated Lab Samples: 10281591002, 10281591003, 10281591004, 10281591005, 10281591006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	09/24/14 14:10	

LABORATORY CONTROL SAMPLE: 1797035

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1797036 1797037

Parameter	Units	10281226046 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	1.4	1.6	55	61	80-120	10	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1797038 1797039

Parameter	Units	10281591003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.78	2.5	2.5	1.7	1.6	36	33	80-120	5	30	M1

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H3	Sample was received or analysis requested beyond the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10281591

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10281591001	**LAO-SS-1-091114**	EPA 200.8	MPRP/49145	EPA 200.8	ICPM/21890
10281591002	**LAO-SS-1-091514**	EPA 200.8	MPRP/49145	EPA 200.8	ICPM/21890
10281591003	**LAO-SS-2-091514**	EPA 200.8	MPRP/49145	EPA 200.8	ICPM/21890
10281591004	**LAO-SS-2T-091514**	EPA 200.8	MPRP/49145	EPA 200.8	ICPM/21890
10281591005	**LAO-SS-3-091514**	EPA 200.8	MPRP/49145	EPA 200.8	ICPM/21890
10281591006	**LAO-SS-4-091514**	EPA 200.8	MPRP/49145	EPA 200.8	ICPM/21890
10281591001	**LAO-SS-1-091114**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10281591002	**LAO-SS-1-091514**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10281591003	**LAO-SS-2-091514**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10281591004	**LAO-SS-2T-091514**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10281591005	**LAO-SS-3-091514**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10281591006	**LAO-SS-4-091514**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10281591002	**LAO-SS-1-091514**	SM 2320B	WET/38304		
10281591003	**LAO-SS-2-091514**	SM 2320B	WET/38304		
10281591004	**LAO-SS-2T-091514**	SM 2320B	WET/38304		
10281591005	**LAO-SS-3-091514**	SM 2320B	WET/38304		
10281591006	**LAO-SS-4-091514**	SM 2320B	WET/38304		
10281591002	**LAO-SS-1-091514**	SM 2540C	WET/38225		
10281591003	**LAO-SS-2-091514**	SM 2540C	WET/38225		
10281591004	**LAO-SS-2T-091514**	SM 2540C	WET/38225		
10281591005	**LAO-SS-3-091514**	SM 2540C	WET/38225		
10281591006	**LAO-SS-4-091514**	SM 2540C	WET/38225		
10281591002	**LAO-SS-1-091514**	SM 2540D	WET/38235		
10281591003	**LAO-SS-2-091514**	SM 2540D	WET/38235		
10281591004	**LAO-SS-2T-091514**	SM 2540D	WET/38235		
10281591005	**LAO-SS-3-091514**	SM 2540D	WET/38235		
10281591006	**LAO-SS-4-091514**	SM 2540D	WET/38235		
10281591002	**LAO-SS-1-091514**	SM 4500-NO3 H	WETA/20325		
10281591003	**LAO-SS-2-091514**	SM 4500-NO3 H	WETA/20325		
10281591004	**LAO-SS-2T-091514**	SM 4500-NO3 H	WETA/20325		
10281591005	**LAO-SS-3-091514**	SM 4500-NO3 H	WETA/20325		
10281591006	**LAO-SS-4-091514**	SM 4500-NO3 H	WETA/20325		

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10281591

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Nitrate/Nitrite	TB/TSS/Alkalinity					Comments
	LAO-SS-1-091114	9/11/14	10:45		X			2			2				X			X							001
	LAO-SS-1-091514	9/15/14	11:36		X			4	X	X	2				X			X	X	X					002
	LAO-SS-2-091514	9/15/14	1240		X			3	X	X	1				X				X	X					003
	LAO-SS-2T-091514	9/15/14	1240		X			3	X	X	1				X				X	X					004
	LAO-SS-3-091514	9/15/14	12:05		X			3	1	1	1				X				X	X					005
	LAO-SS-4-091514	9/15/14	1300		X			3	1	1	1				X				X	X					006

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: T. Hackey						
Sampler's Company: Pioneer Technical Services	Thomas Hackey / PTS	9/15/14	1315	[signature]	9-16-14	10:10
Shipment Method: FedEx Ship Date: 9/15/14						
Shipment Tracking No: 5 5409200 4993						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer Tech

Project #: WO#: 10281591

10281591

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4993

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☑ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.0 **Cooler Temp Corrected (°C):** 0.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.3 **Date and Initials of Person Examining Contents:** 9-16-14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☑ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. 2/1 ☑ HNO_3 2/1 ☑ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 01-06
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☑ No	☐ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1830	Temp: 0.3	Corrected Temp:
Time: 1840	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 9/17/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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October 07, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 23, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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(612)607-1700

CERTIFICATIONS

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia DHHR #:9952C

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SAMPLE SUMMARY

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10282611001	**LAO-SS-1-091814**	Water	09/18/14 09:10	09/23/14 09:45
10282611002	**LAO-SS-1-092214**	Water	09/22/14 12:40	09/23/14 09:45
10282611003	**LAO-SS-2-092214**	Water	09/22/14 13:30	09/23/14 09:45

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SAMPLE ANALYTE COUNT

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10282611001	**LAO-SS-1-091814**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10282611002	**LAO-SS-1-092214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10282611003	**LAO-SS-2-092214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 07, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/49351

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10282206001,10282611001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1799924)
  - Aluminum
  - Calcium
  - Iron
  - Magnesium
  - Zinc
- MS (Lab ID: 1799926)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1799925)
  - Aluminum
  - Calcium
  - Iron
  - Magnesium

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PROJECT NARRATIVE

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 07, 2014

QC Batch: MPRP/49351

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10282206001,10282611001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Zinc

Additional Comments:

Analyte Comments:

QC Batch: MPRP/49351

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1799926)
  - Calcium

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PROJECT NARRATIVE

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: October 07, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Sample: LAO-SS-1-091814 **Lab ID: 10282611001** Collected: 09/18/14 09:10 Received: 09/23/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.048**	mg/L	0.010	0.0012	1	10/01/14 11:40	10/04/14 03:11	7429-90-5	
Arsenic	**0.0032**	mg/L	0.00050	0.00025	1	10/01/14 11:40	10/04/14 03:11	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	10/01/14 11:40	10/04/14 03:11	7440-43-9	
Calcium	**110**	mg/L	0.40	0.084	10	10/01/14 11:40	10/04/14 03:21	7440-70-2	M1
Copper	**0.013**	mg/L	0.0010	0.00022	1	10/01/14 11:40	10/04/14 03:11	7440-50-8	
Iron	**0.081**	mg/L	0.050	0.0080	1	10/01/14 11:40	10/04/14 03:11	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	10/01/14 11:40	10/04/14 03:11	7439-92-1	
Magnesium	**29.2**	mg/L	0.10	0.028	10	10/01/14 11:40	10/04/14 03:21	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	10/01/14 11:40	10/04/14 03:11	7440-22-4	
Total Hardness by 2340B	**394**	mg/L	0.71	0.36	10	10/01/14 11:40	10/04/14 03:21		
Uranium-238	**0.0020**	mg/L	0.00050	0.00025	1	10/01/14 11:40	10/04/14 03:11	7440-61-1	
Zinc	**0.050**	mg/L	0.0050	0.0025	1	10/01/14 11:40	10/04/14 03:11	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 12:01	7439-97-6	

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ANALYTICAL RESULTS

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Sample: LAO-SS-1-092214 **Lab ID: 10282611002** Collected: 09/22/14 12:40 Received: 09/23/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.055**	mg/L	0.010	0.0012	1	10/01/14 11:40	10/04/14 03:26	7429-90-5	
Arsenic	**0.0028**	mg/L	0.00050	0.00025	1	10/01/14 11:40	10/04/14 03:26	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	10/01/14 11:40	10/04/14 03:26	7440-43-9	
Calcium	**112**	mg/L	0.40	0.084	10	10/01/14 11:40	10/04/14 03:31	7440-70-2	
Copper	**0.0074**	mg/L	0.0010	0.00022	1	10/01/14 11:40	10/04/14 03:26	7440-50-8	
Iron	**0.048J**	mg/L	0.050	0.0080	1	10/01/14 11:40	10/04/14 03:26	7439-89-6	
Lead	**0.00064**	mg/L	0.00010	0.000046	1	10/01/14 11:40	10/04/14 03:26	7439-92-1	
Magnesium	**29.3**	mg/L	0.10	0.028	10	10/01/14 11:40	10/04/14 03:31	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/01/14 11:40	10/04/14 03:26	7440-22-4	
Total Hardness by 2340B	**400**	mg/L	0.71	0.36	10	10/01/14 11:40	10/04/14 03:31		
Uranium-238	**0.0013**	mg/L	0.00050	0.00025	1	10/01/14 11:40	10/04/14 03:26	7440-61-1	
Zinc	**0.038**	mg/L	0.0050	0.0025	1	10/01/14 11:40	10/04/14 03:26	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 12:04	7439-97-6	

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ANALYTICAL RESULTS

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Sample: LAO-SS-2-092214 **Lab ID: 10282611003** Collected: 09/22/14 13:30 Received: 09/23/14 09:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.097**	mg/L	0.010	0.0012	1	10/01/14 11:40	10/04/14 03:50	7429-90-5	
Arsenic	**0.040**	mg/L	0.00050	0.00025	1	10/01/14 11:40	10/04/14 03:50	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000033	1	10/01/14 11:40	10/04/14 03:50	7440-43-9	
Calcium	**132**	mg/L	0.80	0.17	20	10/01/14 11:40	10/04/14 03:55	7440-70-2	
Copper	**0.74**	mg/L	0.020	0.0043	20	10/01/14 11:40	10/04/14 03:55	7440-50-8	
Iron	**3.0**	mg/L	0.050	0.0080	1	10/01/14 11:40	10/04/14 03:50	7439-89-6	
Lead	**0.0025**	mg/L	0.00010	0.000046	1	10/01/14 11:40	10/04/14 03:50	7439-92-1	
Magnesium	**33.0**	mg/L	0.20	0.057	20	10/01/14 11:40	10/04/14 03:55	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/01/14 11:40	10/04/14 03:50	7440-22-4	
Total Hardness by 2340B	**464**	mg/L	1.4	0.71	20	10/01/14 11:40	10/04/14 03:55		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	10/01/14 11:40	10/04/14 03:50	7440-61-1	
Zinc	**6.3**	mg/L	0.10	0.050	20	10/01/14 11:40	10/04/14 03:55	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	09/27/14 12:28	09/29/14 12:06	7439-97-6	

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QUALITY CONTROL DATA

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

QC Batch: MERP/11741 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10282611001, 10282611002, 10282611003

METHOD BLANK: 1798697 Matrix: Water
Associated Lab Samples: 10282611001, 10282611002, 10282611003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	09/29/14 11:32	

LABORATORY CONTROL SAMPLE: 1798698

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0047	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1798699 1798700

Parameter	Units	10281591003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0048	97	96	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

QC Batch: MPRP/49351 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10282611001, 10282611002, 10282611003

METHOD BLANK: 1799922 Matrix: Water
Associated Lab Samples: 10282611001, 10282611002, 10282611003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	10/04/14 01:47	
Arsenic	mg/L	ND	0.00050	10/04/14 01:47	
Cadmium	mg/L	ND	0.000080	10/04/14 01:47	
Calcium	mg/L	ND	0.040	10/04/14 01:47	
Copper	mg/L	ND	0.0010	10/04/14 01:47	
Iron	mg/L	ND	0.050	10/04/14 01:47	
Lead	mg/L	ND	0.00010	10/04/14 01:47	
Magnesium	mg/L	ND	0.010	10/04/14 01:47	
Silver	mg/L	ND	0.00050	10/04/14 01:47	
Uranium-238	mg/L	ND	0.00050	10/04/14 01:47	
Zinc	mg/L	ND	0.0050	10/04/14 01:47	

LABORATORY CONTROL SAMPLE: 1799923

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	106	85-115	
Arsenic	mg/L	.08	0.079	98	85-115	
Cadmium	mg/L	.08	0.077	97	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.078	98	85-115	
Iron	mg/L	1	0.99	99	85-115	
Lead	mg/L	.08	0.080	99	85-115	
Magnesium	mg/L	1	0.95	95	85-115	
Silver	mg/L	.08	0.079	98	85-115	
Uranium-238	mg/L	.08	0.077	96	85-115	
Zinc	mg/L	.08	0.079	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1799924 1799925

Parameter	Units	10282206001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	10.5 ug/L	.08	.08	0.13	0.13	150	149	70-130	1	20	M1
Arsenic	mg/L	ND	.08	.08	0.078	0.077	97	96	70-130	1	20	
Cadmium	mg/L	0.40 ug/L	.08	.08	0.075	0.074	94	93	70-130	1	20	
Calcium	mg/L	12800 ug/L	1	1	62.8	63.3	4990	5050	70-130	1	20	M1
Copper	mg/L	2.7 ug/L	.08	.08	0.088	0.088	107	107	70-130	0	20	
Iron	mg/L	106 ug/L	1	1	1.4	1.4	131	131	70-130	0	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1799924 1799925

Parameter	Units	10282206001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	0.43 ug/L	.08	.08	0.076	0.076	95	95	70-130	0	20	
Magnesium	mg/L	2370 ug/L	1	1	12.3	12.4	994	1000	70-130	1	20	M1
Silver	mg/L	ND	.08	.08	0.076	0.076	94	94	70-130	0	20	
Uranium-238	mg/L	ND	.08	.08	0.075	0.075	93	94	70-130	1	20	
Zinc	mg/L	14.8 ug/L	.08	.08	0.16	0.15	176	168	70-130	4	20	M1

MATRIX SPIKE SAMPLE: 1799926

Parameter	Units	10282611001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.048	.08	0.14	121	70-130	
Arsenic	mg/L	0.0032	.08	0.080	96	70-130	
Cadmium	mg/L	0.00018	.08	0.074	93	70-130	
Calcium	mg/L	110	1	108	-172	70-130	E,M1
Copper	mg/L	0.013	.08	0.087	92	70-130	
Iron	mg/L	0.081	1	1.1	99	70-130	
Lead	mg/L	0.0016	.08	0.077	95	70-130	
Magnesium	mg/L	29.2	1	29.0	-24	70-130	M1
Silver	mg/L	ND	.08	0.074	92	70-130	
Uranium-238	mg/L	0.0020	.08	0.077	94	70-130	
Zinc	mg/L	0.050	.08	0.12	94	70-130	

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QUALIFIERS

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BP MT LAO Wetlands (Weekly)
Pace Project No.: 10282611

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10282611001	**LAO-SS-1-091814**	EPA 200.8	MPRP/49351	EPA 200.8	ICPM/21959
10282611002	**LAO-SS-1-092214**	EPA 200.8	MPRP/49351	EPA 200.8	ICPM/21959
10282611003	**LAO-SS-2-092214**	EPA 200.8	MPRP/49351	EPA 200.8	ICPM/21959
10282611001	**LAO-SS-1-091814**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10282611002	**LAO-SS-1-092214**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537
10282611003	**LAO-SS-2-092214**	EPA 245.1	MERP/11741	EPA 245.1	MERC/13537

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Laboratory Management Program LaMP Chain of Custody Record

10282611

Page ____ of ____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ **Rush TAT:** Yes ___ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: _____

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ___

BP Project Manager (PM): ~~Shannon Dunlap~~ Tim Hilmo

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-091814	9/18/14	9:10		X						2				X			X							001
	LAO-SS-1-092214	9/22/14	1240		X						2				X			X							002
	LAO-SS-2-092214	9/22/14	1330		X						1				X										003

Sampler's Name: T Hickey

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 9/22/14

Shipment Tracking No: 554092004982

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
[signature] / PTS	9/22/14	1430	[signature] / FedEx	9/23/14	945

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer

Project #: WO#: 10282611

10282611

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4982

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☐ B88A9130516413 ☑ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 **Cooler Temp Corrected (°C):** 4.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.3 **Date and Initials of Person Examining Contents:** 9/23/14 TJO

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ½ ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1730	Temp: 3.9	Corrected Temp: 4.2	
Time: 1735	put in cooler		
Time:	Temp:	Corrected Temp:	

Project Manager Review: **Date:** 9/25/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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October 22, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on September 30, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10283373001	**LAO-SS-1-092514**	Water	09/25/14 10:15	09/30/14 10:00
10283373002	**LAO-SS-1-092914**	Water	09/29/14 11:30	09/30/14 10:00
10283373003	**LAO-SS-2-092914**	Water	09/29/14 11:45	09/30/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10283373001	**LAO-SS-1-092514**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10283373002	**LAO-SS-1-092914**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10283373003	**LAO-SS-2-092914**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 22, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/49559

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10283373001,10283859008

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1808645)
  - Calcium
  - Magnesium
- MS (Lab ID: 1808647)
  - Calcium
- MSD (Lab ID: 1808646)
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 22, 2014

Analyte Comments:

QC Batch: MPRP/49559

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1808645)
  - Calcium
- MSD (Lab ID: 1808646)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: October 22, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Sample: LAO-SS-1-092514 **Lab ID: 10283373001** Collected: 09/25/14 10:15 Received: 09/30/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0068J**	mg/L	0.010	0.0012	1	10/08/14 17:13	10/10/14 07:42	7429-90-5	
Arsenic	**0.0031**	mg/L	0.00050	0.00025	1	10/08/14 17:13	10/10/14 07:42	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	10/08/14 17:13	10/10/14 07:42	7440-43-9	
Calcium	**125**	mg/L	0.80	0.17	20	10/08/14 17:13	10/10/14 07:56	7440-70-2	M1
Copper	**0.0061**	mg/L	0.0010	0.00022	1	10/08/14 17:13	10/10/14 07:42	7440-50-8	
Iron	**0.018J**	mg/L	0.050	0.0080	1	10/08/14 17:13	10/10/14 07:42	7439-89-6	
Lead	**0.00028**	mg/L	0.00010	0.000046	1	10/08/14 17:13	10/10/14 07:42	7439-92-1	
Magnesium	**32.8**	mg/L	0.20	0.057	20	10/08/14 17:13	10/10/14 07:56	7439-95-4	M1
Silver	**0.00015J**	mg/L	0.00050	0.000056	1	10/08/14 17:13	10/10/14 07:42	7440-22-4	
Total Hardness by 2340B	**447**	mg/L	1.4	0.71	20	10/08/14 17:13	10/10/14 07:56		
Uranium-238	**0.0012**	mg/L	0.00050	0.00025	1	10/08/14 17:13	10/10/14 07:42	7440-61-1	
Zinc	**0.023**	mg/L	0.0050	0.0025	1	10/08/14 17:13	10/10/14 07:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/05/14 18:40	10/07/14 14:33	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Sample: LAO-SS-1-092914 **Lab ID: 10283373002** Collected: 09/29/14 11:30 Received: 09/30/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.033**	mg/L	0.010	0.0012	1	10/08/14 17:13	10/10/14 08:10	7429-90-5	
Arsenic	**0.0032**	mg/L	0.00050	0.00025	1	10/08/14 17:13	10/10/14 08:10	7440-38-2	
Cadmium	**0.00031**	mg/L	0.000080	0.000033	1	10/08/14 17:13	10/10/14 08:10	7440-43-9	
Calcium	**122**	mg/L	0.80	0.17	20	10/08/14 17:13	10/10/14 08:13	7440-70-2	
Copper	**0.017**	mg/L	0.0010	0.00022	1	10/08/14 17:13	10/10/14 08:10	7440-50-8	
Iron	**0.076**	mg/L	0.050	0.0080	1	10/08/14 17:13	10/10/14 08:10	7439-89-6	
Lead	**0.0021**	mg/L	0.00010	0.000046	1	10/08/14 17:13	10/10/14 08:10	7439-92-1	
Magnesium	**31.8**	mg/L	0.20	0.057	20	10/08/14 17:13	10/10/14 08:13	7439-95-4	
Silver	**0.000064J**	mg/L	0.00050	0.000056	1	10/08/14 17:13	10/10/14 08:10	7440-22-4	
Total Hardness by 2340B	**435**	mg/L	1.4	0.71	20	10/08/14 17:13	10/10/14 08:13		
Uranium-238	**0.0014**	mg/L	0.00050	0.00025	1	10/08/14 17:13	10/10/14 08:10	7440-61-1	
Zinc	**0.075**	mg/L	0.0050	0.0025	1	10/08/14 17:13	10/10/14 08:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/05/14 18:40	10/07/14 14:35	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Sample: LAO-SS-2-092914 **Lab ID: 10283373003** Collected: 09/29/14 11:45 Received: 09/30/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.084**	mg/L	0.010	0.0012	1	10/08/14 17:13	10/10/14 08:32	7429-90-5	
Arsenic	**0.029**	mg/L	0.00050	0.00025	1	10/08/14 17:13	10/10/14 08:32	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000033	1	10/08/14 17:13	10/10/14 08:32	7440-43-9	
Calcium	**136**	mg/L	0.80	0.17	20	10/08/14 17:13	10/10/14 08:35	7440-70-2	
Copper	**0.65**	mg/L	0.020	0.0043	20	10/08/14 17:13	10/10/14 08:35	7440-50-8	
Iron	**2.7**	mg/L	0.050	0.0080	1	10/08/14 17:13	10/10/14 08:32	7439-89-6	
Lead	**0.0027**	mg/L	0.00010	0.000046	1	10/08/14 17:13	10/10/14 08:32	7439-92-1	
Magnesium	**34.6**	mg/L	0.20	0.057	20	10/08/14 17:13	10/10/14 08:35	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/08/14 17:13	10/10/14 08:32	7440-22-4	
Total Hardness by 2340B	**482**	mg/L	1.4	0.71	20	10/08/14 17:13	10/10/14 08:35		
Uranium-238	**0.010**	mg/L	0.00050	0.00025	1	10/08/14 17:13	10/10/14 08:32	7440-61-1	
Zinc	**7.0**	mg/L	0.10	0.050	20	10/08/14 17:13	10/10/14 08:35	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/14/14 11:30	10/15/14 13:06	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

QC Batch: MERP/11813 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10283373001, 10283373002

METHOD BLANK: 1806141 | Matrix: Water
Associated Lab Samples: 10283373001, 10283373002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/07/14 13:36	

LABORATORY CONTROL SAMPLE: 1806142

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1806143 1806144

Parameter	Units	10283091002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0049	0.0049	98	97	70-130	1	20	H1

MATRIX SPIKE SAMPLE: 1806145

Parameter	Units	10283438001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0040	79	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

QC Batch: MERP/11889 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10283373003

METHOD BLANK: 1815867 | Matrix: Water
Associated Lab Samples: 10283373003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/15/14 13:01	

LABORATORY CONTROL SAMPLE: 1815868

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1815869 1815870

Parameter	Units	10284426001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0046	0.0049	93	97	70-130	4	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

QC Batch: MPRP/49559 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10283373001, 10283373002, 10283373003

METHOD BLANK: 1808643 Matrix: Water
Associated Lab Samples: 10283373001, 10283373002, 10283373003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	10/10/14 07:36	
Arsenic	mg/L	ND	0.00050	10/10/14 07:36	
Cadmium	mg/L	ND	0.000080	10/10/14 07:36	
Calcium	mg/L	ND	0.040	10/10/14 07:36	
Copper	mg/L	ND	0.0010	10/10/14 07:36	
Iron	mg/L	ND	0.050	10/10/14 07:36	
Lead	mg/L	ND	0.00010	10/10/14 07:36	
Magnesium	mg/L	ND	0.010	10/10/14 07:36	
Silver	mg/L	ND	0.00050	10/10/14 07:36	
Uranium-238	mg/L	ND	0.00050	10/10/14 07:36	
Zinc	mg/L	ND	0.0050	10/10/14 07:36	

LABORATORY CONTROL SAMPLE: 1808644

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.084	105	85-115	
Arsenic	mg/L	.08	0.084	104	85-115	
Cadmium	mg/L	.08	0.086	108	85-115	
Calcium	mg/L	1	1.1	111	85-115	
Copper	mg/L	.08	0.087	108	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.081	102	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Silver	mg/L	.08	0.084	106	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.087	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1808645 1808646

Parameter	Units	10283373001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0068J	.08	.08	0.091	0.088	105	102	70-130	3	20	
Arsenic	mg/L	0.0031	.08	.08	0.093	0.088	112	106	70-130	5	20	
Cadmium	mg/L	0.00015	.08	.08	0.089	0.085	110	106	70-130	4	20	
Calcium	mg/L	125	1	1	129	126	460	125	70-130	3	20	E,M1
Copper	mg/L	0.0061	.08	.08	0.094	0.090	111	105	70-130	5	20	
Iron	mg/L	0.018J	1	1	1.2	1.1	115	108	70-130	6	20	
Lead	mg/L	0.00028	.08	.08	0.082	0.079	103	99	70-130	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1808645 1808646

Parameter	Units	10283373001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.8	1	1	34.7	34.4	193	161	70-130	1	20	M1
Silver	mg/L	0.00015J	.08	.08	0.072	0.071	90	89	70-130	1	20	
Uranium-238	mg/L	0.0012	.08	.08	0.083	0.081	102	100	70-130	3	20	
Zinc	mg/L	0.023	.08	.08	0.11	0.11	114	106	70-130	5	20	

MATRIX SPIKE SAMPLE: 1808647

Parameter	Units	10283859008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	0.055	.08	0.15	112	70-130	
Arsenic	mg/L	0.0042	.08	0.091	108	70-130	
Cadmium	mg/L	0.00029	.08	0.084	105	70-130	
Calcium	mg/L	37900 ug/L	1	39.6	173	70-130	M1
Copper	mg/L	0.032	.08	0.12	107	70-130	
Iron	mg/L	0.11	1	1.2	112	70-130	
Lead	mg/L	0.0051	.08	0.085	100	70-130	
Magnesium	mg/L	8230 ug/L	1	9.3	111	70-130	
Silver	mg/L	0.000063J	.08	0.068	85	70-130	
Uranium-238	mg/L	2.4 ug/L	.08	0.083	101	70-130	
Zinc	mg/L	0.072	.08	0.16	114	70-130	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10283373

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10283373001	**LAO-SS-1-092514**	EPA 200.8	MPRP/49559	EPA 200.8	ICPM/22041
10283373002	**LAO-SS-1-092914**	EPA 200.8	MPRP/49559	EPA 200.8	ICPM/22041
10283373003	**LAO-SS-2-092914**	EPA 200.8	MPRP/49559	EPA 200.8	ICPM/22041
10283373001	**LAO-SS-1-092514**	EPA 245.1	MERP/11813	EPA 245.1	MERC/13612
10283373002	**LAO-SS-1-092914**	EPA 245.1	MERP/11813	EPA 245.1	MERC/13612
10283373003	**LAO-SS-2-092914**	EPA 245.1	MERP/11889	EPA 245.1	MERC/13711

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____

Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 10283373

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)								Comments
	LAO-SS-1 -092514	9/25/14	10:15		X						2				X		X							10283373 001
	LAO-SS-1 -092914	9/29/14	11:30		X						2				X		X							002
	LAO-SS-2 -092914	9/29/14	11:45		X						1				X									003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: DJ Rene	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	DJ Rene / PTS	9/29	15:30	[illegible]	9/30/14	1000
Shipment Method: Fedex Ship Date: 9/29/14						
Shipment Tracking No: 5540 9202 0809						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 3.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer Tech

Project #: WO#: 10283373

10283373

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0809

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☒ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☒ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.0 **Cooler Temp Corrected (°C):** 3.5 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.5 **Date and Initials of Person Examining Contents:** 10/2/14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample #
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 15:20 Temp: 3.5	Corrected Temp:	
Time: 15:26 put in cooler		
Time: Temp:	Corrected Temp:	

Project Manager Review: **Date:** 10/2/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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October 20, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on October 08, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Julie Thieschafer for
Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10284426001	**LAO-SS-1-100214**	Water	10/02/14 10:55	10/08/14 10:00
10284426002	**LAO-SS-1-100614**	Water	10/06/14 14:00	10/08/14 10:00
10284426003	**LAO-SS-2-100614**	Water	10/06/14 14:30	10/08/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10284426001	**LAO-SS-1-100214**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10284426002	**LAO-SS-1-100614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10284426003	**LAO-SS-2-100614**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 20, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/49715

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10284119001,10284499001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1814330)
  - Aluminum
  - Calcium
  - Iron
- MS (Lab ID: 1814332)
  - Aluminum
  - Calcium
  - Magnesium
- MSD (Lab ID: 1814331)
  - Aluminum
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 20, 2014

Analyte Comments:

QC Batch: MPRP/49715

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1814332)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: October 20, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Sample: LAO-SS-1-100214 **Lab ID: 10284426001** Collected: 10/02/14 10:55 Received: 10/08/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0084J**	mg/L	0.010	0.0012	1	10/11/14 15:56	10/14/14 11:22	7429-90-5	
Arsenic	**0.0027**	mg/L	0.00050	0.00025	1	10/11/14 15:56	10/14/14 11:22	7440-38-2	
Cadmium	**0.00014**	mg/L	0.000080	0.000033	1	10/11/14 15:56	10/14/14 11:22	7440-43-9	
Calcium	**109**	mg/L	0.40	0.084	10	10/11/14 15:56	10/14/14 11:26	7440-70-2	
Copper	**0.0070**	mg/L	0.0010	0.00022	1	10/11/14 15:56	10/14/14 11:22	7440-50-8	
Iron	**0.013J**	mg/L	0.050	0.0080	1	10/11/14 15:56	10/14/14 11:22	7439-89-6	
Lead	**0.00051**	mg/L	0.00010	0.000046	1	10/11/14 15:56	10/14/14 11:22	7439-92-1	
Magnesium	**29.7**	mg/L	0.10	0.028	10	10/11/14 15:56	10/14/14 11:26	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/11/14 15:56	10/14/14 11:22	7440-22-4	
Total Hardness by 2340B	**394**	mg/L	0.71	0.36	10	10/11/14 15:56	10/14/14 11:26		
Uranium-238	**0.0016**	mg/L	0.00050	0.00025	1	10/11/14 15:56	10/14/14 11:22	7440-61-1	
Zinc	**0.028**	mg/L	0.0050	0.0025	1	10/11/14 15:56	10/14/14 11:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/14/14 11:30	10/15/14 13:13	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Sample: LAO-SS-1-100614 **Lab ID: 10284426002** Collected: 10/06/14 14:00 Received: 10/08/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0060J**	mg/L	0.010	0.0012	1	10/11/14 15:56	10/14/14 11:31	7429-90-5	
Arsenic	**0.0025**	mg/L	0.00050	0.00025	1	10/11/14 15:56	10/14/14 11:31	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000033	1	10/11/14 15:56	10/14/14 11:31	7440-43-9	
Calcium	**110**	mg/L	0.40	0.084	10	10/11/14 15:56	10/14/14 11:35	7440-70-2	
Copper	**0.0065**	mg/L	0.0010	0.00022	1	10/11/14 15:56	10/14/14 11:31	7440-50-8	
Iron	**0.013J**	mg/L	0.050	0.0080	1	10/11/14 15:56	10/14/14 11:31	7439-89-6	
Lead	**0.00023**	mg/L	0.00010	0.000046	1	10/11/14 15:56	10/14/14 11:31	7439-92-1	
Magnesium	**30.2**	mg/L	0.10	0.028	10	10/11/14 15:56	10/14/14 11:35	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/11/14 15:56	10/14/14 11:31	7440-22-4	
Total Hardness by 2340B	**399**	mg/L	0.71	0.36	10	10/11/14 15:56	10/14/14 11:35		
Uranium-238	**0.0016**	mg/L	0.00050	0.00025	1	10/11/14 15:56	10/14/14 11:31	7440-61-1	
Zinc	**0.028**	mg/L	0.0050	0.0025	1	10/11/14 15:56	10/14/14 11:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/14/14 11:30	10/15/14 13:26	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Sample: LAO-SS-2-100614 **Lab ID: 10284426003** Collected: 10/06/14 14:30 Received: 10/08/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.036**	mg/L	0.010	0.0012	1	10/11/14 15:56	10/14/14 11:40	7429-90-5	
Arsenic	**0.017**	mg/L	0.00050	0.00025	1	10/11/14 15:56	10/14/14 11:40	7440-38-2	
Cadmium	**0.021**	mg/L	0.000080	0.000033	1	10/11/14 15:56	10/14/14 11:40	7440-43-9	
Calcium	**138**	mg/L	0.80	0.17	20	10/11/14 15:56	10/14/14 11:45	7440-70-2	
Copper	**0.39**	mg/L	0.0010	0.00022	1	10/11/14 15:56	10/14/14 11:40	7440-50-8	
Iron	**1.5**	mg/L	0.050	0.0080	1	10/11/14 15:56	10/14/14 11:40	7439-89-6	
Lead	**0.0013**	mg/L	0.00010	0.000046	1	10/11/14 15:56	10/14/14 11:40	7439-92-1	
Magnesium	**36.5**	mg/L	0.20	0.057	20	10/11/14 15:56	10/14/14 11:45	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/11/14 15:56	10/14/14 11:40	7440-22-4	
Total Hardness by 2340B	**495**	mg/L	1.4	0.71	20	10/11/14 15:56	10/14/14 11:45		
Uranium-238	**0.010**	mg/L	0.00050	0.00025	1	10/11/14 15:56	10/14/14 11:40	7440-61-1	
Zinc	**6.3**	mg/L	0.10	0.050	20	10/11/14 15:56	10/14/14 11:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/14/14 11:30	10/15/14 13:28	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

QC Batch: MERP/11889 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10284426001, 10284426002, 10284426003

METHOD BLANK: 1815867 Matrix: Water
Associated Lab Samples: 10284426001, 10284426002, 10284426003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/15/14 13:01	

LABORATORY CONTROL SAMPLE: 1815868

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1815869 1815870

Parameter	Units	10284426001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0046	0.0049	93	97	70-130	4	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

QC Batch: MPRP/49715 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10284426001, 10284426002, 10284426003

METHOD BLANK: 1814328 Matrix: Water
Associated Lab Samples: 10284426001, 10284426002, 10284426003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	10/14/14 11:07	
Arsenic	mg/L	ND	0.00050	10/14/14 11:07	
Cadmium	mg/L	ND	0.000080	10/14/14 11:07	
Calcium	mg/L	ND	0.040	10/14/14 11:07	
Copper	mg/L	ND	0.0010	10/14/14 11:07	
Iron	mg/L	ND	0.050	10/14/14 11:07	
Lead	mg/L	ND	0.00010	10/14/14 11:07	
Magnesium	mg/L	ND	0.010	10/14/14 11:07	
Silver	mg/L	ND	0.00050	10/14/14 11:07	
Uranium-238	mg/L	ND	0.00050	10/14/14 11:07	
Zinc	mg/L	ND	0.0050	10/14/14 11:07	

LABORATORY CONTROL SAMPLE: 1814329

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.084	104	85-115	
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.081	102	85-115	
Calcium	mg/L	1	0.98	98	85-115	
Copper	mg/L	.08	0.083	103	85-115	
Iron	mg/L	1	1.0	101	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.085	106	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1814330 1814331

Parameter	Units	10284119001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	6070 ug/L	.08	.08	7.1	7.4	1320	1680	70-130	4	20	M1
Arsenic	mg/L	7.7 ug/L	.08	.08	0.087	0.087	99	99	70-130	0	20	
Cadmium	mg/L	0.17 ug/L	.08	.08	0.081	0.081	101	101	70-130	0	20	
Calcium	mg/L	36900 ug/L	1	1	38.3	38.7	142	178	70-130	1	20	M1
Copper	mg/L	16.7 ug/L	.08	.08	0.096	0.098	99	102	70-130	2	20	
Iron	mg/L	8670 ug/L	1	1	9.2	9.7	52	108	70-130	6	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1814330 1814331

Parameter	Units	10284119001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	mg/L	20.7 ug/L	.08	.08	0.10	0.10	102	104	70-130	2	20	
Magnesium	mg/L	5780 ug/L	1	1	6.9	7.1	112	132	70-130	3	20	M1
Silver	mg/L	ND	.08	.08	0.082	0.084	103	105	70-130	2	20	
Uranium-238	mg/L	1.6 ug/L	.08	.08	0.076	0.076	93	94	70-130	0	20	
Zinc	mg/L	59.6 ug/L	.08	.08	0.14	0.14	105	107	70-130	1	20	

MATRIX SPIKE SAMPLE: 1814332

Parameter	Units	10284499001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	234 ug/L	.08	0.36	159	70-130	M1
Arsenic	mg/L	0.67 ug/L	.08	0.083	103	70-130	
Cadmium	mg/L	0.10 ug/L	.08	0.079	99	70-130	
Calcium	mg/L	99800 ug/L	1	100	46	70-130	E,M1
Copper	mg/L	158 ug/L	.08	0.24	103	70-130	
Iron	mg/L	652 ug/L	1	1.6	99	70-130	
Lead	mg/L	1.9 ug/L	.08	0.083	101	70-130	
Magnesium	mg/L	28800 ug/L	1	29.4	57	70-130	M1
Silver	mg/L	1.3 ug/L	.08	0.082	101	70-130	
Uranium-238	mg/L	0.81 ug/L	.08	0.081	101	70-130	
Zinc	mg/L	123 ug/L	.08	0.21	109	70-130	

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10284426

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10284426001	**LAO-SS-1-100214**	EPA 200.8	MPRP/49715	EPA 200.8	ICPM/22109
10284426002	**LAO-SS-1-100614**	EPA 200.8	MPRP/49715	EPA 200.8	ICPM/22109
10284426003	**LAO-SS-2-100614**	EPA 200.8	MPRP/49715	EPA 200.8	ICPM/22109
10284426001	**LAO-SS-1-100214**	EPA 245.1	MERP/11889	EPA 245.1	MERC/13711
10284426002	**LAO-SS-1-100614**	EPA 245.1	MERP/11889	EPA 245.1	MERC/13711
10284426003	**LAO-SS-2-100614**	EPA 245.1	MERP/11889	EPA 245.1	MERC/13711

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Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** 10/21/14 **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 102844426

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-100214	10/2/14	10:55		X						2				X			X							001
	LAO-SS-1-100614	10/6/14	14:00		X						2				X			X							002
	LAO-SS-2-100614	10/6/14	14:30		X						1				X										003

Sampler's Name: Brad Hollamon

Sampler's Company: Pioneer Technical Services

Shipment Method: FedEx Ship Date: 10/7/14

Shipment Tracking No: 5540 9202 0810

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Brad Hollamon / PTS	10/7/14	12:15	[illegible] / PACE	10-8-14	1000

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.7 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer Technical Services

Project #: WO# : 10284426

10284426

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other: _____

Tracking Number: 5540 9202 0810

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.3 **Cooler Temp Corrected (°C):** 2.7 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.4 **Date and Initials of Person Examining Contents:** 10-8-14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 01-02 2/2 03 1/1
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1515	Temp: 2.3	Corrected Temp. 2.7
Time: 1530	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 10/9/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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1700 Elm Street - Suite 200
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October 27, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on October 14, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10285156001	**LAO-SS-1 100914**	Water	10/09/14 10:00	10/14/14 09:30
10285156002	**LAO-SS-1 101314**	Water	10/13/14 11:50	10/14/14 09:30
10285156003	**LAO-SS-2 101314**	Water	10/13/14 12:40	10/14/14 09:30
10285156004	**LAO-SS-1T 101314**	Water	10/13/14 11:50	10/14/14 09:30
10285156005	**LAO-SS-3- 101314**	Water	10/13/14 11:36	10/14/14 09:30
10285156006	**LAO-SS-4-101314**	Water	10/13/14 12:55	10/14/14 09:30

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10285156001	**LAO-SS-1 100914**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10285156002	**LAO-SS-1 101314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	1	PASI-M
		SM 2540C	SH	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10285156003	**LAO-SS-2 101314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	1	PASI-M
		SM 2540C	SH	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10285156004	**LAO-SS-1T 101314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	1	PASI-M
		SM 2540C	SH	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10285156005	**LAO-SS-3- 101314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	1	PASI-M
		SM 2540C	SH	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10285156006	**LAO-SS-4-101314**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	1	PASI-M
		SM 2540C	SH	1	PASI-M
		SM 2540D	SH	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 27, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/49898

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10285156001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1820361)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1820362)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 27, 2014

Analyte Comments:

QC Batch: MPRP/49898

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1820361)
  - Calcium
- MSD (Lab ID: 1820362)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: October 27, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: October 27, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: October 27, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: October 27, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: October 27, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/20776

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10285156002,10285320010

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1821611)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1821612)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Sample: LAO-SS-1 100914 **Lab ID: 10285156001** Collected: 10/09/14 10:00 Received: 10/14/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.027**	mg/L	0.010	0.0012	1	10/23/14 09:47	10/23/14 23:00	7429-90-5	
Arsenic	**0.0028**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/23/14 23:00	7440-38-2	
Cadmium	**0.00017**	mg/L	0.000080	0.000033	1	10/23/14 09:47	10/23/14 23:00	7440-43-9	
Calcium	**129**	mg/L	0.40	0.084	10	10/23/14 09:47	10/23/14 23:25	7440-70-2	M1
Copper	**0.0094**	mg/L	0.0010	0.00022	1	10/23/14 09:47	10/23/14 23:00	7440-50-8	
Iron	**0.047J**	mg/L	0.050	0.0080	1	10/23/14 09:47	10/23/14 23:00	7439-89-6	
Lead	**0.00092**	mg/L	0.00010	0.000046	1	10/23/14 09:47	10/23/14 23:00	7439-92-1	
Magnesium	**37.4**	mg/L	0.10	0.028	10	10/23/14 09:47	10/23/14 23:25	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	10/23/14 09:47	10/23/14 23:00	7440-22-4	
Total Hardness by 2340B	**477**	mg/L	0.71	0.36	10	10/23/14 09:47	10/23/14 23:25		
Uranium-238	**0.0016**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/23/14 23:00	7440-61-1	
Zinc	**0.039**	mg/L	0.0050	0.0025	1	10/23/14 09:47	10/23/14 23:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/20/14 17:25	10/21/14 11:27	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Sample: LAO-SS-1 101314 **Lab ID: 10285156002** Collected: 10/13/14 11:50 Received: 10/14/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.052**	mg/L	0.010	0.0012	1	10/23/14 09:47	10/23/14 23:59	7429-90-5	
Arsenic	**0.0032**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/23/14 23:59	7440-38-2	
Cadmium	**0.00022**	mg/L	0.000080	0.000033	1	10/23/14 09:47	10/23/14 23:59	7440-43-9	
Calcium	**111**	mg/L	0.40	0.084	10	10/23/14 09:47	10/24/14 00:04	7440-70-2	
Copper	**0.013**	mg/L	0.0010	0.00022	1	10/23/14 09:47	10/23/14 23:59	7440-50-8	
Iron	**0.083**	mg/L	0.050	0.0080	1	10/23/14 09:47	10/23/14 23:59	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	10/23/14 09:47	10/23/14 23:59	7439-92-1	
Magnesium	**32.4**	mg/L	0.10	0.028	10	10/23/14 09:47	10/24/14 00:04	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/23/14 09:47	10/23/14 23:59	7440-22-4	
Total Hardness by 2340B	**411**	mg/L	0.71	0.36	10	10/23/14 09:47	10/24/14 00:04		
Uranium-238	**0.0021**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/23/14 23:59	7440-61-1	
Zinc	**0.055**	mg/L	0.0050	0.0025	1	10/23/14 09:47	10/23/14 23:59	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/20/14 17:25	10/21/14 11:29	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**28.9**	mg/L	5.0	2.5	1		10/16/14 09:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**714**	mg/L	10.0	5.0	1		10/16/14 13:56		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		10/15/14 16:20		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.36**	mg/L	0.10	0.050	1		10/20/14 13:00		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Sample: LAO-SS-2 101314 **Lab ID: 10285156003** Collected: 10/13/14 12:40 Received: 10/14/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.12**	mg/L	0.010	0.0012	1	10/23/14 09:47	10/24/14 00:09	7429-90-5	
Arsenic	**0.034**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:09	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000033	1	10/23/14 09:47	10/24/14 00:09	7440-43-9	
Calcium	**137**	mg/L	0.40	0.084	10	10/23/14 09:47	10/24/14 00:14	7440-70-2	
Copper	**0.96**	mg/L	0.010	0.0022	10	10/23/14 09:47	10/24/14 00:14	7440-50-8	
Iron	**3.0**	mg/L	0.050	0.0080	1	10/23/14 09:47	10/24/14 00:09	7439-89-6	
Lead	**0.0032**	mg/L	0.00010	0.000046	1	10/23/14 09:47	10/24/14 00:09	7439-92-1	
Magnesium	**37.3**	mg/L	0.10	0.028	10	10/23/14 09:47	10/24/14 00:14	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/23/14 09:47	10/24/14 00:09	7440-22-4	
Total Hardness by 2340B	**496**	mg/L	0.71	0.36	10	10/23/14 09:47	10/24/14 00:14		
Uranium-238	**0.011**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:09	7440-61-1	
Zinc	**5.8**	mg/L	0.50	0.25	100	10/23/14 09:47	10/24/14 12:15	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/20/14 17:25	10/21/14 11:37	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**120**	mg/L	5.0	2.5	1		10/16/14 09:55		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**787**	mg/L	10.0	5.0	1		10/16/14 13:56		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**11.0**	mg/L	10.0	5.0	1		10/15/14 16:20		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.72**	mg/L	0.10	0.050	1		10/20/14 13:05		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Sample: LAO-SS-1T 101314 **Lab ID: 10285156004** Collected: 10/13/14 11:50 Received: 10/14/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.050**	mg/L	0.010	0.0012	1	10/23/14 09:47	10/24/14 00:19	7429-90-5	
Arsenic	**0.0030**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:19	7440-38-2	
Cadmium	**0.00024**	mg/L	0.000080	0.000033	1	10/23/14 09:47	10/24/14 00:19	7440-43-9	
Calcium	**128**	mg/L	0.40	0.084	10	10/23/14 09:47	10/24/14 00:24	7440-70-2	
Copper	**0.014**	mg/L	0.0010	0.00022	1	10/23/14 09:47	10/24/14 00:19	7440-50-8	
Iron	**0.082**	mg/L	0.050	0.0080	1	10/23/14 09:47	10/24/14 00:19	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	10/23/14 09:47	10/24/14 00:19	7439-92-1	
Magnesium	**37.4**	mg/L	0.10	0.028	10	10/23/14 09:47	10/24/14 00:24	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/23/14 09:47	10/24/14 00:19	7440-22-4	
Total Hardness by 2340B	**474**	mg/L	0.71	0.36	10	10/23/14 09:47	10/24/14 00:24		
Uranium-238	**0.0021**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:19	7440-61-1	
Zinc	**0.060**	mg/L	0.0050	0.0025	1	10/23/14 09:47	10/24/14 00:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/20/14 17:25	10/21/14 11:39	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**28.4**	mg/L	5.0	2.5	1		10/16/14 09:59		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**653**	mg/L	10.0	5.0	1		10/16/14 13:56		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		10/15/14 16:20		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.36**	mg/L	0.10	0.050	1		10/20/14 13:08		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Sample: LAO-SS-3- 101314 **Lab ID: 10285156005** Collected: 10/13/14 11:36 Received: 10/14/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.40**	mg/L	0.010	0.0012	1	10/23/14 09:47	10/24/14 00:28	7429-90-5	
Arsenic	**0.0048**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:28	7440-38-2	
Cadmium	**0.048**	mg/L	0.000080	0.000033	1	10/23/14 09:47	10/24/14 00:28	7440-43-9	
Calcium	**158**	mg/L	0.40	0.084	10	10/23/14 09:47	10/24/14 00:33	7440-70-2	
Copper	**4.2**	mg/L	0.010	0.0022	10	10/23/14 09:47	10/24/14 00:33	7440-50-8	
Iron	**11.3**	mg/L	0.050	0.0080	1	10/23/14 09:47	10/24/14 00:28	7439-89-6	
Lead	**0.0026**	mg/L	0.00010	0.000046	1	10/23/14 09:47	10/24/14 00:28	7439-92-1	
Magnesium	**43.5**	mg/L	0.10	0.028	10	10/23/14 09:47	10/24/14 00:33	7439-95-4	
Silver	**0.000075J**	mg/L	0.00050	0.000056	1	10/23/14 09:47	10/24/14 00:28	7440-22-4	
Total Hardness by 2340B	**573**	mg/L	0.71	0.36	10	10/23/14 09:47	10/24/14 00:33		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:28	7440-61-1	
Zinc	**8.8**	mg/L	0.50	0.25	100	10/23/14 09:47	10/24/14 12:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/20/14 17:25	10/21/14 11:41	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**72.4**	mg/L	5.0	2.5	1		10/16/14 10:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**838**	mg/L	10.0	5.0	1		10/16/14 13:56		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**28.0**	mg/L	10.0	5.0	1		10/15/14 16:20		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.6**	mg/L	0.10	0.050	1		10/20/14 13:09		

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ANALYTICAL RESULTS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Sample: LAO-SS-4-101314 **Lab ID: 10285156006** Collected: 10/13/14 12:55 Received: 10/14/14 09:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.010	0.0012	1	10/23/14 09:47	10/24/14 00:38	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:38	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	10/23/14 09:47	10/24/14 00:38	7440-43-9	
Calcium	**0.013J**	mg/L	0.040	0.0084	1	10/23/14 09:47	10/24/14 00:38	7440-70-2	
Copper	**0.00052J**	mg/L	0.0010	0.00022	1	10/23/14 09:47	10/24/14 00:38	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	10/23/14 09:47	10/24/14 00:38	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	10/23/14 09:47	10/24/14 00:38	7439-92-1	
Magnesium	ND	mg/L	0.010	0.0028	1	10/23/14 09:47	10/24/14 00:38	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/23/14 09:47	10/24/14 00:38	7440-22-4	
Total Hardness by 2340B	**0.040J**	mg/L	0.071	0.036	1	10/23/14 09:47	10/24/14 00:38		
Uranium-238	ND	mg/L	0.00050	0.00025	1	10/23/14 09:47	10/24/14 00:38	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	10/23/14 09:47	10/24/14 00:38	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/20/14 17:25	10/21/14 11:44	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		10/16/14 11:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**9.0J**	mg/L	10.0	5.0	1		10/16/14 13:56		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		10/15/14 16:20		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		10/20/14 13:10		

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

QC Batch: MERP/11928 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10285156001, 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

METHOD BLANK: 1821381 Matrix: Water
Associated Lab Samples: 10285156001, 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/21/14 11:22	

LABORATORY CONTROL SAMPLE: 1821382

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0046	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1821383 1821384

Parameter	Units	10285156002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0047	0.0049	93	98	70-130	5	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

QC Batch: MPRP/49898 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10285156001, 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

METHOD BLANK: 1820359 Matrix: Water
Associated Lab Samples: 10285156001, 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	10/23/14 22:55	
Arsenic	mg/L	ND	0.00050	10/23/14 22:55	
Cadmium	mg/L	ND	0.000080	10/23/14 22:55	
Calcium	mg/L	ND	0.040	10/23/14 22:55	
Copper	mg/L	ND	0.0010	10/23/14 22:55	
Iron	mg/L	ND	0.050	10/23/14 22:55	
Lead	mg/L	ND	0.00010	10/23/14 22:55	
Magnesium	mg/L	ND	0.010	10/23/14 22:55	
Silver	mg/L	ND	0.00050	10/23/14 22:55	
Uranium-238	mg/L	ND	0.00050	10/23/14 22:55	
Zinc	mg/L	ND	0.0050	10/23/14 22:55	

LABORATORY CONTROL SAMPLE: 1820360

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.079	99	85-115	
Arsenic	mg/L	.08	0.076	95	85-115	
Cadmium	mg/L	.08	0.075	93	85-115	
Calcium	mg/L	1	0.92	92	85-115	
Copper	mg/L	.08	0.076	95	85-115	
Iron	mg/L	1	0.96	96	85-115	
Lead	mg/L	.08	0.075	94	85-115	
Magnesium	mg/L	1	0.94	94	85-115	
Silver	mg/L	.08	0.075	94	85-115	
Uranium-238	mg/L	.08	0.075	94	85-115	
Zinc	mg/L	.08	0.076	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1820361 1820362

Parameter	Units	10285156001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.027	.08	.08	0.11	0.11	105	105	70-130	0	20	
Arsenic	mg/L	0.0028	.08	.08	0.080	0.080	96	96	70-130	0	20	
Cadmium	mg/L	0.00017	.08	.08	0.077	0.075	97	94	70-130	3	20	
Calcium	mg/L	129	1	1	99.7	99.4	-2970	-3000	70-130	0	20	E,M1
Copper	mg/L	0.0094	.08	.08	0.085	0.085	94	94	70-130	0	20	
Iron	mg/L	0.047J	1	1	1.0	1.0	96	96	70-130	0	20	
Lead	mg/L	0.00092	.08	.08	0.076	0.076	94	93	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1820361 1820362

Parameter	Units	10285156001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	37.4	1	1	28.7	28.6	-876	-888	70-130	0	20	M1
Silver	mg/L	ND	.08	.08	0.073	0.073	92	91	70-130	1	20	
Uranium-238	mg/L	0.0016	.08	.08	0.078	0.077	96	95	70-130	1	20	
Zinc	mg/L	0.039	.08	.08	0.12	0.12	98	98	70-130	0	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

QC Batch: WET/38728 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

METHOD BLANK: 1818306 Matrix: Water
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	10/16/14 09:03	

LABORATORY CONTROL SAMPLE & LCSD: 1818307 1818308

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	42.1	42.2	105	105	90-110	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1818309 1818310

Parameter	Units	10284853001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	597000 ug/L	40	40	635	631	96	85	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1818311 1818312

Parameter	Units	10285156002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	28.9	40	40	69.1	69.8	101	102	80-120	1	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

QC Batch: WET/38732 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

METHOD BLANK: 1818372 Matrix: Water
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10/16/14 13:56	

LABORATORY CONTROL SAMPLE: 1818373

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	970	97	80-120	

SAMPLE DUPLICATE: 1818374

Parameter	Units	10285189001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1650	1760	6	10	

SAMPLE DUPLICATE: 1818375

Parameter	Units	10285189002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1530	1480	3	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

QC Batch: WET/38721 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

METHOD BLANK: 1817685 Matrix: Water
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	10/15/14 16:20	

LABORATORY CONTROL SAMPLE: 1817686

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94.0	94	80-120	

SAMPLE DUPLICATE: 1817687

Parameter	Units	10285189001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	1850	2000	8	10	

SAMPLE DUPLICATE: 1817688

Parameter	Units	10285189002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	1550	1710	10	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

QC Batch: WETA/20776 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

METHOD BLANK: 1821609 | Matrix: Water
Associated Lab Samples: 10285156002, 10285156003, 10285156004, 10285156005, 10285156006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	10/20/14 12:59	

LABORATORY CONTROL SAMPLE: 1821610

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1821611 1821612

Parameter	Units	10285156002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.36	2.5	2.5	0.85	0.82	20	19	80-120	3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1821613 1821614

Parameter	Units	10285320010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.75	2.5	2.5	3.2	3.1	96	96	80-120	1	30	

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QUALIFIERS

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (WEEKLY)
Pace Project No.: 10285156

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10285156001	**LAO-SS-1 100914**	EPA 200.8	MPRP/49898	EPA 200.8	ICPM/22237
10285156002	**LAO-SS-1 101314**	EPA 200.8	MPRP/49898	EPA 200.8	ICPM/22237
10285156003	**LAO-SS-2 101314**	EPA 200.8	MPRP/49898	EPA 200.8	ICPM/22237
10285156004	**LAO-SS-1T 101314**	EPA 200.8	MPRP/49898	EPA 200.8	ICPM/22237
10285156005	**LAO-SS-3- 101314**	EPA 200.8	MPRP/49898	EPA 200.8	ICPM/22237
10285156006	**LAO-SS-4-101314**	EPA 200.8	MPRP/49898	EPA 200.8	ICPM/22237
10285156001	**LAO-SS-1 100914**	EPA 245.1	MERP/11928	EPA 245.1	MERC/13779
10285156002	**LAO-SS-1 101314**	EPA 245.1	MERP/11928	EPA 245.1	MERC/13779
10285156003	**LAO-SS-2 101314**	EPA 245.1	MERP/11928	EPA 245.1	MERC/13779
10285156004	**LAO-SS-1T 101314**	EPA 245.1	MERP/11928	EPA 245.1	MERC/13779
10285156005	**LAO-SS-3- 101314**	EPA 245.1	MERP/11928	EPA 245.1	MERC/13779
10285156006	**LAO-SS-4-101314**	EPA 245.1	MERP/11928	EPA 245.1	MERC/13779
10285156002	**LAO-SS-1 101314**	SM 2320B	WET/38728		
10285156003	**LAO-SS-2 101314**	SM 2320B	WET/38728		
10285156004	**LAO-SS-1T 101314**	SM 2320B	WET/38728		
10285156005	**LAO-SS-3- 101314**	SM 2320B	WET/38728		
10285156006	**LAO-SS-4-101314**	SM 2320B	WET/38728		
10285156002	**LAO-SS-1 101314**	SM 2540C	WET/38732		
10285156003	**LAO-SS-2 101314**	SM 2540C	WET/38732		
10285156004	**LAO-SS-1T 101314**	SM 2540C	WET/38732		
10285156005	**LAO-SS-3- 101314**	SM 2540C	WET/38732		
10285156006	**LAO-SS-4-101314**	SM 2540C	WET/38732		
10285156002	**LAO-SS-1 101314**	SM 2540D	WET/38721		
10285156003	**LAO-SS-2 101314**	SM 2540D	WET/38721		
10285156004	**LAO-SS-1T 101314**	SM 2540D	WET/38721		
10285156005	**LAO-SS-3- 101314**	SM 2540D	WET/38721		
10285156006	**LAO-SS-4-101314**	SM 2540D	WET/38721		
10285156002	**LAO-SS-1 101314**	SM 4500-NO3 H	WETA/20776		
10285156003	**LAO-SS-2 101314**	SM 4500-NO3 H	WETA/20776		
10285156004	**LAO-SS-1T 101314**	SM 4500-NO3 H	WETA/20776		
10285156005	**LAO-SS-3- 101314**	SM 4500-NO3 H	WETA/20776		
10285156006	**LAO-SS-4-101314**	SM 4500-NO3 H	WETA/20776		

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10285156

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x / Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	NO2/NO3	Alkalinity, TDS, TSS					Comments
	LAO-SS-1 -100914	10/9/14	10:00		X			2			2				X			X								do 1
	LAO-SS-1 -101314	10/13/14	11:50		X			4	X	X	2				X			X	X	X						do 2
	LAO-SS-2 -101314	10/13/14	12:40		X			3	X	X	1				X				X	X						do 3
	LAO-SS-1T-101314	10/13/14	11:50		X			3	X	X	X				X				X	X						do 4
	LAO-SS-3-101314	10/13/14	11:36		X			3	X	X	X				X				X	X						do 5
	LAO-SS-3-101314	10/13/14	12:55		X			3	X	X	X				X				X	X						do 6

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: DRenz, THickey						
Sampler's Company: Pioneer Technical Services	/PTS/	10/13/14	1400	PACE	10-14-14	930
Shipment Method: FedEx Ship Date: 10/13/14						
Shipment Tracking No: 554092020920						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer Technical Services

Project #: WO# : 10285156

10285156

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0820

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.6 **Cooler Temp Corrected (°C):** 2.0 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.4 **Date and Initials of Person Examining Contents:** 10-14-14 AA

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☒ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 2-6 1/1 3-6 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 16:10	Temp: 1.6	Corrected Temp: 2.0
Time: 16:25	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 10/15/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

October 31, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on October 21, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10285982001	**LAO-SS-1-101614**	Water	10/16/14 14:25	10/21/14 15:00
10285982002	**LAO-SS-1-102014**	Water	10/20/14 12:00	10/21/14 15:00
10285982003	**LAO-SS-2-102014**	Water	10/20/14 12:30	10/21/14 15:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10285982001	**LAO-SS-1-101614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10285982002	**LAO-SS-1-102014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10285982003	**LAO-SS-2-102014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: October 31, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/50052

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10286060001,10286254007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1825636)
  - Calcium
- MS (Lab ID: 1825638)
  - Aluminum

Additional Comments:

Analyte Comments:

QC Batch: MPRP/50052

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1825638)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: October 31, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Sample: LAO-SS-1-101614 **Lab ID: 10285982001** Collected: 10/16/14 14:25 Received: 10/21/14 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.012**	mg/L	0.010	0.0012	1	10/27/14 18:26	10/29/14 11:31	7429-90-5	
Arsenic	**0.0029**	mg/L	0.00050	0.00025	1	10/27/14 18:26	10/29/14 11:31	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	10/27/14 18:26	10/29/14 11:31	7440-43-9	
Calcium	**110**	mg/L	0.80	0.17	20	10/27/14 18:26	10/28/14 15:52	7440-70-2	
Copper	**0.0080**	mg/L	0.0010	0.00022	1	10/27/14 18:26	10/29/14 11:31	7440-50-8	
Iron	**0.026J**	mg/L	0.050	0.0080	1	10/27/14 18:26	10/29/14 11:31	7439-89-6	
Lead	**0.00047**	mg/L	0.00010	0.000046	1	10/27/14 18:26	10/29/14 11:31	7439-92-1	
Magnesium	**33.4**	mg/L	0.20	0.057	20	10/27/14 18:26	10/28/14 15:52	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/27/14 18:26	10/29/14 11:31	7440-22-4	
Total Hardness by 2340B	**413**	mg/L	1.4	0.71	20	10/27/14 18:26	10/28/14 15:52		
Uranium-238	**0.0020**	mg/L	0.00050	0.00025	1	10/27/14 18:26	10/29/14 11:31	7440-61-1	
Zinc	**0.034**	mg/L	0.0050	0.0025	1	10/27/14 18:26	10/29/14 11:31	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/23/14 17:40	10/30/14 10:41	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Sample: LAO-SS-1-102014 **Lab ID: 10285982002** Collected: 10/20/14 12:00 Received: 10/21/14 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0071J**	mg/L	0.010	0.0012	1	10/27/14 18:26	10/29/14 11:34	7429-90-5	
Arsenic	**0.0025**	mg/L	0.00050	0.00025	1	10/27/14 18:26	10/29/14 11:34	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	10/27/14 18:26	10/29/14 11:34	7440-43-9	
Calcium	**123**	mg/L	0.80	0.17	20	10/27/14 18:26	10/28/14 16:06	7440-70-2	
Copper	**0.0069**	mg/L	0.0010	0.00022	1	10/27/14 18:26	10/29/14 11:34	7440-50-8	
Iron	**0.016J**	mg/L	0.050	0.0080	1	10/27/14 18:26	10/29/14 11:34	7439-89-6	
Lead	**0.00025**	mg/L	0.00010	0.000046	1	10/27/14 18:26	10/29/14 11:34	7439-92-1	
Magnesium	**37.9**	mg/L	0.20	0.057	20	10/27/14 18:26	10/28/14 16:06	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/27/14 18:26	10/29/14 11:34	7440-22-4	
Total Hardness by 2340B	**462**	mg/L	1.4	0.71	20	10/27/14 18:26	10/28/14 16:06		
Uranium-238	**0.0025**	mg/L	0.00050	0.00025	1	10/27/14 18:26	10/29/14 11:34	7440-61-1	
Zinc	**0.041**	mg/L	0.0050	0.0025	1	10/27/14 18:26	10/29/14 11:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/23/14 17:40	10/30/14 10:44	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Sample: LAO-SS-2-102014 **Lab ID: 10285982003** Collected: 10/20/14 12:30 Received: 10/21/14 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.11**	mg/L	0.010	0.0012	1	10/27/14 18:26	10/28/14 16:08	7429-90-5	
Arsenic	**0.025**	mg/L	0.00050	0.00025	1	10/27/14 18:26	10/28/14 16:08	7440-38-2	
Cadmium	**0.028**	mg/L	0.000080	0.000033	1	10/27/14 18:26	10/28/14 16:08	7440-43-9	
Calcium	**140**	mg/L	0.80	0.17	20	10/27/14 18:26	10/28/14 16:11	7440-70-2	
Copper	**0.60**	mg/L	0.020	0.0043	20	10/27/14 18:26	10/28/14 16:11	7440-50-8	
Iron	**2.8**	mg/L	0.050	0.0080	1	10/27/14 18:26	10/28/14 16:08	7439-89-6	
Lead	**0.0030**	mg/L	0.00010	0.000046	1	10/27/14 18:26	10/28/14 16:08	7439-92-1	
Magnesium	**36.9**	mg/L	0.20	0.057	20	10/27/14 18:26	10/28/14 16:11	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	10/27/14 18:26	10/28/14 16:08	7440-22-4	
Total Hardness by 2340B	**500**	mg/L	1.4	0.71	20	10/27/14 18:26	10/28/14 16:11		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	10/27/14 18:26	10/28/14 16:08	7440-61-1	
Zinc	**6.4**	mg/L	0.10	0.050	20	10/27/14 18:26	10/28/14 16:11	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	10/23/14 17:40	10/30/14 10:46	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

QC Batch: MERP/11959 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10285982001, 10285982002, 10285982003

METHOD BLANK: 1824644 Matrix: Water
Associated Lab Samples: 10285982001, 10285982002, 10285982003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	10/30/14 10:29	

LABORATORY CONTROL SAMPLE: 1824645

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1824646 1824647

Parameter	Units	10286919001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0052	0.0051	104	102	70-130	2	20	

MATRIX SPIKE SAMPLE: 1824648

Parameter	Units	10285982003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0050	101	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

QC Batch: MPRP/50052 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10285982001, 10285982002, 10285982003

METHOD BLANK: 1825634 Matrix: Water
Associated Lab Samples: 10285982001, 10285982002, 10285982003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	10/29/14 11:17	
Arsenic	mg/L	ND	0.00050	10/28/14 15:27	
Cadmium	mg/L	ND	0.000080	10/28/14 15:27	
Calcium	mg/L	0.019J	0.040	10/28/14 15:27	
Copper	mg/L	ND	0.0010	10/29/14 11:17	
Iron	mg/L	ND	0.050	10/28/14 15:27	
Lead	mg/L	ND	0.00010	10/29/14 11:17	
Magnesium	mg/L	0.0039J	0.010	10/28/14 15:27	
Silver	mg/L	ND	0.00050	10/28/14 15:27	
Uranium-238	mg/L	ND	0.00050	10/28/14 15:27	
Zinc	mg/L	ND	0.0050	10/28/14 15:27	

LABORATORY CONTROL SAMPLE: 1825635

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.086	108	85-115	
Arsenic	mg/L	.08	0.083	103	85-115	
Cadmium	mg/L	.08	0.084	104	85-115	
Calcium	mg/L	1	1.1	107	85-115	
Copper	mg/L	.08	0.084	105	85-115	
Iron	mg/L	1	1.1	109	85-115	
Lead	mg/L	.08	0.087	109	85-115	
Magnesium	mg/L	1	1.1	108	85-115	
Silver	mg/L	.08	0.087	109	85-115	
Uranium-238	mg/L	.08	0.088	110	85-115	
Zinc	mg/L	.08	0.085	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1825636 1825637

Parameter	Units	10286060001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	<10.0 ug/L	.08	.08	0.092	0.095	107	110	70-130	3	20	
Arsenic	mg/L	1.6 ug/L	.08	.08	0.085	0.087	104	106	70-130	2	20	
Cadmium	mg/L	<0.000080	.08	.08	0.082	0.082	103	103	70-130	0	20	
Calcium	mg/L	19.6	1	1	20.2	20.8	68	128	70-130	3	20	M1
Copper	mg/L	<0.0010	.08	.08	0.085	0.088	106	110	70-130	3	20	
Iron	mg/L	<0.050	1	1	1.1	1.1	107	111	70-130	3	20	
Lead	mg/L	<0.00010	.08	.08	0.082	0.085	103	106	70-130	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1825636 1825637

Parameter	Units	10286060001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	5.6	1	1	6.8	6.9	116	128	70-130	2	20	
Silver	mg/L	<0.50 ug/L	.08	.08	0.081	0.082	102	103	70-130	1	20	
Uranium-238	mg/L	<0.50 ug/L	.08	.08	0.083	0.085	103	106	70-130	3	20	
Zinc	mg/L	0.012	.08	.08	0.096	0.096	105	105	70-130	0	20	

MATRIX SPIKE SAMPLE: 1825638

Parameter	Units	10286254007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	29.8 ug/L	.08	0.13	131	70-130	M1
Arsenic	mg/L	9.9 ug/L	.08	0.098	110	70-130	
Cadmium	mg/L	ND	.08	0.083	104	70-130	
Calcium	mg/L	267000 ug/L	1	270	301	70-130	E
Copper	mg/L	ND	.08	0.080	99	70-130	
Iron	mg/L	1580 ug/L	1	2.6	105	70-130	
Lead	mg/L	ND	.08	0.083	104	70-130	
Magnesium	mg/L	69100 ug/L	1	69.9	80	70-130	
Silver	mg/L	ND	.08	0.078	97	70-130	
Uranium-238	mg/L	ND	.08	0.084	104	70-130	
Zinc	mg/L	6.6 ug/L	.08	0.092	107	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands WEEKLY
Pace Project No.: 10285982

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10285982001	**LAO-SS-1-101614**	EPA 200.8	MPRP/50052	EPA 200.8	ICPM/22280
10285982002	**LAO-SS-1-102014**	EPA 200.8	MPRP/50052	EPA 200.8	ICPM/22280
10285982003	**LAO-SS-2-102014**	EPA 200.8	MPRP/50052	EPA 200.8	ICPM/22280
10285982001	**LAO-SS-1-101614**	EPA 245.1	MERP/11959	EPA 245.1	MERC/13820
10285982002	**LAO-SS-1-102014**	EPA 245.1	MERP/11959	EPA 245.1	MERC/13820
10285982003	**LAO-SS-2-102014**	EPA 245.1	MERP/11959	EPA 245.1	MERC/13820

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Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** 11/3/14 **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10285982

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	LAO-SS-1-101614	10/16/14	1425		X						2				X	X	001
	LAO-SS-1-102014	10/20/14	1200		X						2				X	X	002
	LAO-SS-2-102014	↓	1230		X						1				X		003

Sampler's Name:	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature]	10/20/14	1500	Alyssa Ponder	10-24-14	1500
Shipment Method: FedEx Ship Date: 10/20/14						
Shipment Tracking No:						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 28Feb2014 Page 1 of 1
	Document No.: **F-MN-L-213-rev.09**	Issuing Authority: Pace Minnesota Quality Off

Sample Condition Upon Receipt

Client Name: BP

Project #: WO#: 10285982

10285982

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0831

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 **Cooler Temp Corrected (°C):** 4.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.4 **Date and Initials of Person Examining Contents:** AMP 10-21-14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: wt	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 1-2 2/2 1 1/1
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☒ No		Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Date: 10/22/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #:

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0831

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 **Cooler Temp Corrected (°C):** 4.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.4 **Date and Initials of Person Examining Contents:** AMP 10-21-14

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 1-2 2/2 1 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1230	Temp: 3.9	Corrected Temp: 4.3
Time: 1245	put in cooler	
Time: 1245	Temp: 3.9	Corrected Temp: 4.3

Project Manager Review: **Date:** 10/22/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

November 11, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on October 29, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10286988001	**LAO-SS-1-102314**	Water	10/23/14 14:40	10/29/14 09:50
10286988002	**LAO-SS-1-102714**	Water	10/27/14 12:00	10/29/14 09:50
10286988003	**LAO-SS-2-102714**	Water	10/27/14 12:30	10/29/14 09:50

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10286988001	**LAO-SS-1-102314**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10286988002	**LAO-SS-1-102714**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10286988003	**LAO-SS-2-102714**	EPA 200.8	AJM	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: November 11, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/50252

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10286988001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1831417)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1831418)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: November 11, 2014

Analyte Comments:

QC Batch: MPRP/50252

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1831417)
  - Calcium
- MSD (Lab ID: 1831418)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: November 11, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Sample: LAO-SS-1-102314 **Lab ID: 10286988001** Collected: 10/23/14 14:40 Received: 10/29/14 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.013**	mg/L	0.010	0.0012	1	11/03/14 23:18	11/06/14 18:46	7429-90-5	
Arsenic	**0.0023**	mg/L	0.00050	0.00025	1	11/03/14 23:18	11/06/14 18:46	7440-38-2	
Cadmium	**0.00026**	mg/L	0.000080	0.000033	1	11/03/14 23:18	11/06/14 18:46	7440-43-9	
Calcium	**112**	mg/L	0.40	0.084	10	11/03/14 23:18	11/06/14 19:49	7440-70-2	
Copper	**0.0090**	mg/L	0.0010	0.00022	1	11/03/14 23:18	11/06/14 18:46	7440-50-8	
Iron	**0.027J**	mg/L	0.050	0.0080	1	11/03/14 23:18	11/06/14 18:46	7439-89-6	
Lead	**0.00065**	mg/L	0.00010	0.000046	1	11/03/14 23:18	11/06/14 18:46	7439-92-1	
Magnesium	**30.8**	mg/L	0.10	0.028	10	11/03/14 23:18	11/06/14 19:49	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/03/14 23:18	11/06/14 18:46	7440-22-4	
Total Hardness by 2340B	**406**	mg/L	0.71	0.36	10	11/03/14 23:18	11/06/14 19:49		
Uranium-238	**0.0031**	mg/L	0.00050	0.00025	1	11/03/14 23:18	11/06/14 18:46	7440-61-1	
Zinc	**0.054**	mg/L	0.0050	0.0025	1	11/03/14 23:18	11/06/14 18:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/03/14 22:10	11/04/14 12:43	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Sample: LAO-SS-1-102714 **Lab ID: 10286988002** Collected: 10/27/14 12:00 Received: 10/29/14 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0048J**	mg/L	0.010	0.0012	1	11/03/14 23:18	11/06/14 19:10	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.00025	1	11/03/14 23:18	11/06/14 19:10	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	11/03/14 23:18	11/06/14 19:10	7440-43-9	
Calcium	**112**	mg/L	0.40	0.084	10	11/03/14 23:18	11/06/14 19:15	7440-70-2	
Copper	**0.0057**	mg/L	0.0010	0.00022	1	11/03/14 23:18	11/06/14 19:10	7440-50-8	
Iron	**0.013J**	mg/L	0.050	0.0080	1	11/03/14 23:18	11/06/14 19:10	7439-89-6	
Lead	**0.00021**	mg/L	0.00010	0.000046	1	11/03/14 23:18	11/06/14 19:10	7439-92-1	
Magnesium	**30.0**	mg/L	0.10	0.028	10	11/03/14 23:18	11/06/14 19:15	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/03/14 23:18	11/06/14 19:10	7440-22-4	
Total Hardness by 2340B	**403**	mg/L	0.71	0.36	10	11/03/14 23:18	11/06/14 19:15		
Uranium-238	**0.0027**	mg/L	0.00050	0.00025	1	11/03/14 23:18	11/06/14 19:10	7440-61-1	
Zinc	**0.033**	mg/L	0.0050	0.0025	1	11/03/14 23:18	11/06/14 19:10	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/03/14 22:10	11/04/14 12:46	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Sample: LAO-SS-2-102714 **Lab ID: 10286988003** Collected: 10/27/14 12:30 Received: 10/29/14 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.041**	mg/L	0.010	0.0012	1	11/03/14 23:18	11/06/14 19:40	7429-90-5	
Arsenic	**0.012**	mg/L	0.00050	0.00025	1	11/03/14 23:18	11/06/14 19:40	7440-38-2	
Cadmium	**0.022**	mg/L	0.000080	0.000033	1	11/03/14 23:18	11/06/14 19:40	7440-43-9	
Calcium	**128**	mg/L	2.0	0.42	50	11/03/14 23:18	11/06/14 19:44	7440-70-2	
Copper	**0.40**	mg/L	0.0010	0.00022	1	11/03/14 23:18	11/06/14 19:40	7440-50-8	
Iron	**1.8**	mg/L	0.050	0.0080	1	11/03/14 23:18	11/06/14 19:40	7439-89-6	
Lead	**0.0016**	mg/L	0.00010	0.000046	1	11/03/14 23:18	11/06/14 19:40	7439-92-1	
Magnesium	**32.3**	mg/L	0.50	0.14	50	11/03/14 23:18	11/06/14 19:44	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/03/14 23:18	11/06/14 19:40	7440-22-4	
Total Hardness by 2340B	**452**	mg/L	3.6	1.8	50	11/03/14 23:18	11/06/14 19:44		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	11/03/14 23:18	11/06/14 19:40	7440-61-1	
Zinc	**6.2**	mg/L	0.25	0.12	50	11/03/14 23:18	11/06/14 19:44	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/03/14 22:10	11/04/14 12:48	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

QC Batch: MERP/12050 | Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 | Analysis Description: 245.1 Mercury
Associated Lab Samples: 10286988001, 10286988002, 10286988003

METHOD BLANK: 1833621 | Matrix: Water
Associated Lab Samples: 10286988001, 10286988002, 10286988003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	11/04/14 12:10	

LABORATORY CONTROL SAMPLE: 1833622

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1833623 1833624

Parameter	Units	10286887001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0036	0.0038	72	75	70-130	3	20	

MATRIX SPIKE SAMPLE: 1833625

Parameter	Units	10286864001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0037	74	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

QC Batch: MPRP/50252 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10286988001, 10286988002, 10286988003

METHOD BLANK: 1831415 Matrix: Water
Associated Lab Samples: 10286988001, 10286988002, 10286988003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0013J	0.010	11/06/14 18:41	
Arsenic	mg/L	ND	0.00050	11/06/14 18:41	
Cadmium	mg/L	ND	0.000080	11/06/14 18:41	
Calcium	mg/L	ND	0.040	11/06/14 18:41	
Copper	mg/L	0.00028J	0.0010	11/06/14 18:41	
Iron	mg/L	ND	0.050	11/06/14 18:41	
Lead	mg/L	ND	0.00010	11/06/14 18:41	
Magnesium	mg/L	ND	0.010	11/06/14 18:41	
Silver	mg/L	ND	0.00050	11/06/14 18:41	
Uranium-238	mg/L	ND	0.00050	11/06/14 18:41	
Zinc	mg/L	0.0039J	0.0050	11/06/14 18:41	

LABORATORY CONTROL SAMPLE: 1831416

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.077	97	85-115	
Arsenic	mg/L	.08	0.076	95	85-115	
Cadmium	mg/L	.08	0.078	97	85-115	
Calcium	mg/L	1	0.92	92	85-115	
Copper	mg/L	.08	0.077	97	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.083	103	85-115	
Magnesium	mg/L	1	0.96	96	85-115	
Silver	mg/L	.08	0.077	97	85-115	
Uranium-238	mg/L	.08	0.077	97	85-115	
Zinc	mg/L	.08	0.078	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1831417 1831418

Parameter	Units	10286988001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.013	.08	.08	0.090	0.092	97	99	70-130	2	20	
Arsenic	mg/L	0.0023	.08	.08	0.080	0.079	97	96	70-130	1	20	
Cadmium	mg/L	0.00026	.08	.08	0.077	0.076	96	95	70-130	1	20	
Calcium	mg/L	112	1	1	102	104	-1010	-796	70-130	2	20	E,M1
Copper	mg/L	0.0090	.08	.08	0.084	0.085	93	94	70-130	1	20	
Iron	mg/L	0.027J	1	1	0.98	0.97	95	94	70-130	1	20	
Lead	mg/L	0.00065	.08	.08	0.079	0.079	98	98	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1831417 1831418

Parameter	Units	10286988001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	30.8	1	1	28.2	28.7	-263	-207	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.075	0.075	93	94	70-130	0	20	
Uranium-238	mg/L	0.0031	.08	.08	0.080	0.079	96	95	70-130	0	20	
Zinc	mg/L	0.054	.08	.08	0.13	0.13	95	96	70-130	0	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10286988

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10286988001	**LAO-SS-1-102314**	EPA 200.8	MPRP/50252	EPA 200.8	ICPM/22366
10286988002	**LAO-SS-1-102714**	EPA 200.8	MPRP/50252	EPA 200.8	ICPM/22366
10286988003	**LAO-SS-2-102714**	EPA 200.8	MPRP/50252	EPA 200.8	ICPM/22366
10286988001	**LAO-SS-1-102314**	EPA 245.1	MERP/12050	EPA 245.1	MERC/13916
10286988002	**LAO-SS-1-102714**	EPA 245.1	MERP/12050	EPA 245.1	MERC/13916
10286988003	**LAO-SS-2-102714**	EPA 245.1	MERP/12050	EPA 245.1	MERC/13916

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Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): 11/10/14

Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 1028698

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): ~~Shannon Dunlap~~ Tim Hilmo

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 102314	10/23/14	1440		X						2				X			X							001
	LAO-SS-1 102714	10/27/14	12:00		X						2				X			X							002
	LAO-SS-2 102714	10/27/14	12:30		X						1				X										003

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey, Brad Hollamon						
Sampler's Company: Pioneer Technical Services	PTS	10/28/14	10:30		10/29	~~5.1~~ 950
Shipment Method: Fed Ex Ship Date: 10/23/14						
Shipment Tracking No: 554092020842						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 5.1 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer Tech

Project #: WO#: 10286988

10286988

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9202 0842

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☐ B88A9130516413 ☑ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.8 **Cooler Temp Corrected (°C):** 5.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.3 **Date and Initials of Person Examining Contents:** KH 10-29-14

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☑ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☑ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 01-03
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 15:50 Temp: 5.1	Corrected Temp:
Time: 15:55 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: Date: 10/30/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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November 20, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on November 04, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10287627001	**LAO-SS-1-103014**	Water	10/30/14 12:00	11/04/14 09:50
10287627002	**LAO-SS-1-110314**	Water	11/03/14 11:05	11/04/14 09:50
10287627003	**LAO-SS-2-110314**	Water	11/03/14 11:50	11/04/14 09:50

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10287627001	**LAO-SS-1-103014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10287627002	**LAO-SS-1-110314**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10287627003	**LAO-SS-2-110314**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: November 20, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/50610

B: Analyte was detected in the associated method blank.

- BLANK for HBN 328954 [MPRP/506 (Lab ID: 1843505)
  - Iron

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/50610

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10287627003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1843507)
  - Calcium
  - Magnesium
  - Zinc
- MSD (Lab ID: 1843508)
  - Calcium
  - Magnesium
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: November 20, 2014

QC Batch: MPRP/50610

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10287627003

R1: RPD value was outside control limits.

- MSD (Lab ID: 1843508)
  - Arsenic
  - Cadmium
  - Lead
  - Silver
  - Uranium-238

Additional Comments:

Analyte Comments:

QC Batch: MPRP/50610

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1843507)
  - Calcium
  - Zinc
- MSD (Lab ID: 1843508)
  - Zinc

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: November 20, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Sample: LAO-SS-1-103014 **Lab ID: 10287627001** Collected: 10/30/14 12:00 Received: 11/04/14 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0045J**	mg/L	0.010	0.0012	1	11/13/14 17:47	11/18/14 12:08	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.00025	1	11/13/14 17:47	11/18/14 12:08	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	11/13/14 17:47	11/18/14 12:08	7440-43-9	
Calcium	**107**	mg/L	0.80	0.17	20	11/13/14 17:47	11/18/14 12:10	7440-70-2	
Copper	**0.0055**	mg/L	0.0010	0.00022	1	11/13/14 17:47	11/18/14 12:08	7440-50-8	
Iron	**0.022J**	mg/L	0.050	0.0080	1	11/13/14 17:47	11/18/14 12:08	7439-89-6	B
Lead	**0.00021**	mg/L	0.00010	0.000046	1	11/13/14 17:47	11/18/14 12:08	7439-92-1	
Magnesium	**31.1**	mg/L	0.20	0.057	20	11/13/14 17:47	11/18/14 12:10	7439-95-4	
Silver	**0.000084J**	mg/L	0.00050	0.000056	1	11/13/14 17:47	11/18/14 12:08	7440-22-4	
Total Hardness by 2340B	**396**	mg/L	1.4	0.71	20	11/13/14 17:47	11/18/14 12:10		
Uranium-238	**0.0028**	mg/L	0.00050	0.00025	1	11/13/14 17:47	11/18/14 12:08	7440-61-1	
Zinc	**0.036**	mg/L	0.0050	0.0025	1	11/13/14 17:47	11/18/14 12:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/12/14 10:45	11/14/14 16:25	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Sample: LAO-SS-1-110314 **Lab ID: 10287627002** Collected: 11/03/14 11:05 Received: 11/04/14 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0027J**	mg/L	0.010	0.0012	1	11/13/14 17:47	11/18/14 12:13	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.00025	1	11/13/14 17:47	11/18/14 12:13	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	11/13/14 17:47	11/18/14 12:13	7440-43-9	
Calcium	**103**	mg/L	0.80	0.17	20	11/13/14 17:47	11/18/14 12:16	7440-70-2	
Copper	**0.0054**	mg/L	0.0010	0.00022	1	11/13/14 17:47	11/18/14 12:13	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0080	1	11/13/14 17:47	11/18/14 12:13	7439-89-6	B
Lead	**0.00019**	mg/L	0.00010	0.000046	1	11/13/14 17:47	11/18/14 12:13	7439-92-1	
Magnesium	**30.7**	mg/L	0.20	0.057	20	11/13/14 17:47	11/18/14 12:16	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/13/14 17:47	11/18/14 12:13	7440-22-4	
Total Hardness by 2340B	**385**	mg/L	1.4	0.71	20	11/13/14 17:47	11/18/14 12:16		
Uranium-238	**0.0034**	mg/L	0.00050	0.00025	1	11/13/14 17:47	11/18/14 12:13	7440-61-1	
Zinc	**0.032**	mg/L	0.0050	0.0025	1	11/13/14 17:47	11/18/14 12:13	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/12/14 10:45	11/14/14 16:27	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Sample: LAO-SS-2-110314 **Lab ID: 10287627003** Collected: 11/03/14 11:50 Received: 11/04/14 09:50 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.12**	mg/L	0.010	0.0012	1	11/13/14 17:47	11/19/14 13:56	7429-90-5	
Arsenic	**0.024**	mg/L	0.00050	0.00025	1	11/13/14 17:47	11/18/14 12:19	7440-38-2	R1
Cadmium	**0.021**	mg/L	0.000080	0.000033	1	11/13/14 17:47	11/18/14 12:19	7440-43-9	R1
Calcium	**129**	mg/L	0.80	0.17	20	11/13/14 17:47	11/18/14 12:35	7440-70-2	M1
Copper	**0.76**	mg/L	0.020	0.0043	20	11/13/14 17:47	11/18/14 12:35	7440-50-8	
Iron	**3.8**	mg/L	0.050	0.0080	1	11/13/14 17:47	11/18/14 12:19	7439-89-6	
Lead	**0.0037**	mg/L	0.00010	0.000046	1	11/13/14 17:47	11/18/14 12:19	7439-92-1	R1
Magnesium	**36.2**	mg/L	0.20	0.057	20	11/13/14 17:47	11/18/14 12:35	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	11/13/14 17:47	11/18/14 12:19	7440-22-4	R1
Total Hardness by 2340B	**472**	mg/L	1.4	0.71	20	11/13/14 17:47	11/18/14 12:35		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	11/13/14 17:47	11/18/14 12:19	7440-61-1	R1
Zinc	**6.1**	mg/L	0.10	0.050	20	11/13/14 17:47	11/18/14 12:35	7440-66-6	M1
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/12/14 10:45	11/14/14 16:30	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

QC Batch: MERP/12098 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10287627001, 10287627002, 10287627003

METHOD BLANK: 1838787 Matrix: Water
Associated Lab Samples: 10287627001, 10287627002, 10287627003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	11/14/14 16:20	

LABORATORY CONTROL SAMPLE: 1838788

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1838789 1838790

Parameter	Units	10287627003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0053	0.0053	105	106	70-130	0	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

QC Batch: MPRP/50610 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10287627001, 10287627002, 10287627003

METHOD BLANK: 1843505 Matrix: Water
Associated Lab Samples: 10287627001, 10287627002, 10287627003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	11/18/14 12:01	
Arsenic	mg/L	ND	0.00050	11/18/14 12:01	
Cadmium	mg/L	ND	0.000080	11/18/14 12:01	
Calcium	mg/L	0.011J	0.040	11/18/14 12:01	
Copper	mg/L	ND	0.0010	11/18/14 12:01	
Iron	mg/L	0.011J	0.050	11/18/14 12:01	
Lead	mg/L	ND	0.00010	11/18/14 12:01	
Magnesium	mg/L	0.0095J	0.010	11/18/14 12:01	
Silver	mg/L	ND	0.00050	11/18/14 12:01	
Uranium-238	mg/L	ND	0.00050	11/18/14 12:01	
Zinc	mg/L	ND	0.0050	11/18/14 12:01	

LABORATORY CONTROL SAMPLE: 1843506

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.078	98	85-115	
Calcium	mg/L	1	1.1	110	85-115	
Copper	mg/L	.08	0.086	107	85-115	
Iron	mg/L	1	1.0	103	85-115	
Lead	mg/L	.08	0.082	102	85-115	
Magnesium	mg/L	1	1.1	112	85-115	
Silver	mg/L	.08	0.086	108	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.082	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1843507 1843508

Parameter	Units	10287627003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.12	.08	.11	0.21	0.25	120	115	70-130	16	20	
Arsenic	mg/L	0.024	.08	.11	0.11	0.14	106	104	70-130	27	20	R1
Cadmium	mg/L	0.021	.08	.11	0.10	0.14	103	101	70-130	28	20	R1
Calcium	mg/L	129	1	1.4	132	129	266	-14	70-130	2	20	E,M1
Copper	mg/L	0.76	.08	.11	0.85	0.89	120	117	70-130	4	20	
Iron	mg/L	3.8	1	1.4	5.0	5.4	120	113	70-130	8	20	
Lead	mg/L	0.0037	.08	.11	0.086	0.12	103	101	70-130	33	20	R1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1843507 1843508

Parameter	Units	10287627003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	36.2	1	1.4	36.2	36.1	-2	-6	70-130	0	20	M1
Silver	mg/L	ND	.08	.11	0.085	0.12	106	107	70-130	36	20	R1
Uranium-238	mg/L	0.013	.08	.11	0.096	0.13	105	105	70-130	31	20	R1
Zinc	mg/L	6.1	.08	.11	6.4	6.4	373	259	70-130	0	20	E,M1

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10287627

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10287627001	**LAO-SS-1-103014**	EPA 200.8	MPRP/50610	EPA 200.8	ICPM/22472
10287627002	**LAO-SS-1-110314**	EPA 200.8	MPRP/50610	EPA 200.8	ICPM/22472
10287627003	**LAO-SS-2-110314**	EPA 200.8	MPRP/50610	EPA 200.8	ICPM/22472
10287627001	**LAO-SS-1-103014**	EPA 245.1	MERP/12098	EPA 245.1	MERC/14013
10287627002	**LAO-SS-1-110314**	EPA 245.1	MERP/12098	EPA 245.1	MERC/14013
10287627003	**LAO-SS-2-110314**	EPA 245.1	MERP/12098	EPA 245.1	MERC/14013

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10287627

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	LAO-SS-1 - 103014	10/30/14	1200		X			2			2				X	X	001
	LAO-SS-1 - 110314	11/3/14	11:05		X			2			2				X	X	002
	LAO-SS-2 - 110314	11/3/14	11:50		X			1			1				X		003

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: Thomas Hickey, D Renz						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	11/3/14	1300	[signature] / Pace	11/4/14	9:50
Shipment Method: Fed Ex Ship Date: 11/3/14						
Shipment Tracking No: 5540920049 71						

Special Instructions:

11/4/14 WDM

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: ~~[illegible]~~ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

5.0

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10287627

10287627

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4971

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☒ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.7 **Cooler Temp Corrected (°C):** 5.0 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.3 **Date and Initials of Person Examining Contents:** 11/4/14 WPM

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 9:50	Temp: 4.7	Corrected Temp: 5.0
Time: 9:55	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 11/5/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

November 25, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on November 11, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10288403001	**LAO-SS-1-110614**	Water	11/06/14 14:00	11/11/14 09:20
10288403002	**LAO-SS-1-111014**	Water	11/10/14 11:00	11/11/14 09:20
10288403003	**LAO-SS-2-111014**	Water	11/10/14 11:30	11/11/14 09:20

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10288403001	**LAO-SS-1-110614**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10288403002	**LAO-SS-1-111014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10288403003	**LAO-SS-2-111014**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: November 25, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/50597

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10288403001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1842893)
  - Magnesium
- MSD (Lab ID: 1842894)
  - Calcium
  - Magnesium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/50597

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1842893)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: November 25, 2014

Analyte Comments:

QC Batch: MPRP/50597

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1842894)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: November 25, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Sample: LAO-SS-1-110614 **Lab ID: 10288403001** Collected: 11/06/14 14:00 Received: 11/11/14 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0023J**	mg/L	0.010	0.0012	1	11/19/14 14:24	11/20/14 16:19	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.00025	1	11/19/14 14:24	11/20/14 16:19	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	11/19/14 14:24	11/20/14 16:19	7440-43-9	
Calcium	**112**	mg/L	0.80	0.17	20	11/19/14 14:24	11/20/14 16:32	7440-70-2	M1
Copper	**0.0052**	mg/L	0.0010	0.00022	1	11/19/14 14:24	11/20/14 16:19	7440-50-8	
Iron	**0.013J**	mg/L	0.050	0.0080	1	11/19/14 14:24	11/20/14 16:19	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	11/19/14 14:24	11/20/14 16:19	7439-92-1	
Magnesium	**32.0**	mg/L	0.20	0.057	20	11/19/14 14:24	11/20/14 16:32	7439-95-4	M1
Silver	**0.00011J**	mg/L	0.00050	0.000056	1	11/19/14 14:24	11/20/14 16:19	7440-22-4	
Total Hardness by 2340B	**412**	mg/L	1.4	0.71	20	11/19/14 14:24	11/20/14 16:32		
Uranium-238	**0.0033**	mg/L	0.00050	0.00025	1	11/19/14 14:24	11/20/14 16:19	7440-61-1	
Zinc	**0.032**	mg/L	0.0050	0.0025	1	11/19/14 14:24	11/20/14 16:19	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/19/14 20:30	11/21/14 14:32	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Sample: LAO-SS-1-111014 **Lab ID: 10288403002** Collected: 11/10/14 11:00 Received: 11/11/14 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0062J**	mg/L	0.010	0.0012	1	11/19/14 14:24	11/21/14 08:14	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.00025	1	11/19/14 14:24	11/20/14 16:46	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	11/19/14 14:24	11/20/14 16:46	7440-43-9	
Calcium	**111**	mg/L	0.80	0.17	20	11/19/14 14:24	11/20/14 16:49	7440-70-2	
Copper	**0.0052**	mg/L	0.0010	0.00022	1	11/19/14 14:24	11/20/14 16:46	7440-50-8	
Iron	**0.015J**	mg/L	0.050	0.0080	1	11/19/14 14:24	11/20/14 16:46	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	11/19/14 14:24	11/20/14 16:46	7439-92-1	
Magnesium	**32.2**	mg/L	0.20	0.057	20	11/19/14 14:24	11/20/14 16:49	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/19/14 14:24	11/20/14 16:46	7440-22-4	
Total Hardness by 2340B	**409**	mg/L	1.4	0.71	20	11/19/14 14:24	11/20/14 16:49		
Uranium-238	**0.0038**	mg/L	0.00050	0.00025	1	11/19/14 14:24	11/20/14 16:46	7440-61-1	
Zinc	**0.034**	mg/L	0.0050	0.0025	1	11/19/14 14:24	11/20/14 16:46	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/19/14 20:30	11/21/14 14:34	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Sample: LAO-SS-2-111014 **Lab ID: 10288403003** Collected: 11/10/14 11:30 Received: 11/11/14 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.059**	mg/L	0.010	0.0012	1	11/19/14 14:24	11/21/14 08:16	7429-90-5	
Arsenic	**0.017**	mg/L	0.00050	0.00025	1	11/19/14 14:24	11/20/14 16:52	7440-38-2	
Cadmium	**0.020**	mg/L	0.000080	0.000033	1	11/19/14 14:24	11/20/14 16:52	7440-43-9	
Calcium	**134**	mg/L	0.80	0.17	20	11/19/14 14:24	11/20/14 16:55	7440-70-2	
Copper	**0.44**	mg/L	0.0010	0.00022	1	11/19/14 14:24	11/20/14 16:52	7440-50-8	
Iron	**2.4**	mg/L	0.050	0.0080	1	11/19/14 14:24	11/20/14 16:52	7439-89-6	
Lead	**0.0022**	mg/L	0.00010	0.000046	1	11/19/14 14:24	11/20/14 16:52	7439-92-1	
Magnesium	**34.6**	mg/L	0.20	0.057	20	11/19/14 14:24	11/20/14 16:55	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/19/14 14:24	11/20/14 16:52	7440-22-4	
Total Hardness by 2340B	**478**	mg/L	1.4	0.71	20	11/19/14 14:24	11/20/14 16:55		
Uranium-238	**0.012**	mg/L	0.00050	0.00025	1	11/19/14 14:24	11/20/14 16:52	7440-61-1	
Zinc	**5.4**	mg/L	0.10	0.050	20	11/19/14 14:24	11/20/14 16:55	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/19/14 20:30	11/21/14 14:36	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

QC Batch: MERP/12151 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10288403001, 10288403002, 10288403003

METHOD BLANK: 1843923 Matrix: Water
Associated Lab Samples: 10288403001, 10288403002, 10288403003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	11/21/14 14:27	

LABORATORY CONTROL SAMPLE: 1843924

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0046	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1843925 1843926

Parameter	Units	10288403003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0048	0.0048	95	95	70-130	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

QC Batch: MPRP/50597 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10288403001, 10288403002, 10288403003

METHOD BLANK: 1842891 Matrix: Water
Associated Lab Samples: 10288403001, 10288403002, 10288403003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	11/20/14 16:13	
Arsenic	mg/L	ND	0.00050	11/20/14 16:13	
Cadmium	mg/L	ND	0.000080	11/20/14 16:13	
Calcium	mg/L	ND	0.040	11/20/14 16:13	
Copper	mg/L	ND	0.0010	11/20/14 16:13	
Iron	mg/L	ND	0.050	11/20/14 16:13	
Lead	mg/L	ND	0.00010	11/20/14 16:13	
Magnesium	mg/L	ND	0.010	11/20/14 16:13	
Silver	mg/L	ND	0.00050	11/20/14 16:13	
Uranium-238	mg/L	ND	0.00050	11/20/14 16:13	
Zinc	mg/L	ND	0.0050	11/20/14 16:13	

LABORATORY CONTROL SAMPLE: 1842892

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.081	101	85-115	
Arsenic	mg/L	.08	0.081	101	85-115	
Cadmium	mg/L	.08	0.079	99	85-115	
Calcium	mg/L	1	1.1	106	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	1.1	110	85-115	
Lead	mg/L	.08	0.086	108	85-115	
Magnesium	mg/L	1	1.0	102	85-115	
Silver	mg/L	.08	0.089	111	85-115	
Uranium-238	mg/L	.08	0.080	100	85-115	
Zinc	mg/L	.08	0.079	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1842893 1842894

Parameter	Units	10288403001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0023J	.08	.08	0.079	0.081	96	99	70-130	2	20	
Arsenic	mg/L	0.0020	.08	.08	0.085	0.086	104	105	70-130	0	20	
Cadmium	mg/L	0.00018	.08	.08	0.080	0.079	100	98	70-130	1	20	
Calcium	mg/L	112	1	1	113	113	70	33	70-130	0	20	E,M1
Copper	mg/L	0.0052	.08	.08	0.084	0.084	99	99	70-130	0	20	
Iron	mg/L	0.013J	1	1	1.1	1.1	110	109	70-130	1	20	
Lead	mg/L	0.00016	.08	.08	0.080	0.078	100	98	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1842893 1842894

Parameter	Units	10288403001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.0	1	1	32.0	31.6	-4	-40	70-130	1	20	M1
Silver	mg/L	0.00011J	.08	.08	0.075	0.074	93	93	70-130	1	20	
Uranium-238	mg/L	0.0033	.08	.08	0.081	0.079	97	95	70-130	2	20	
Zinc	mg/L	0.032	.08	.08	0.11	0.11	98	97	70-130	1	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10288403

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10288403001	**LAO-SS-1-110614**	EPA 200.8	MPRP/50597	EPA 200.8	ICPM/22533
10288403002	**LAO-SS-1-111014**	EPA 200.8	MPRP/50597	EPA 200.8	ICPM/22533
10288403003	**LAO-SS-2-111014**	EPA 200.8	MPRP/50597	EPA 200.8	ICPM/22533
10288403001	**LAO-SS-1-110614**	EPA 245.1	MERP/12151	EPA 245.1	MERC/14082
10288403002	**LAO-SS-1-111014**	EPA 245.1	MERP/12151	EPA 245.1	MERC/14082
10288403003	**LAO-SS-2-111014**	EPA 245.1	MERP/12151	EPA 245.1	MERC/14082

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

Page 1 of 1

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): 11/24/14

Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 10288403

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	630 1/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____
BP Project Manager (PM):	Shannon Dunlap				
BP PM Phone:	406-782-9964				
BP PM Email:					

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 ~ 110614	11/6/14	14:00		X						2				X		X							001
	LAO-SS-1 ~ 111014	11/10/14	11:00		X						2				X		X							002
	LAO-SS-2 ~ 111014	↓	11:30		X						1				X									003

Requested Analyses

Report Type & QC Level: Standard x; Full Data Package ____

Comments: Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name: Brad Hollamon

Sampler's Company: Pioneer Technical Services

Shipment Method: Fed Ex Ship Date: 11/10/14

Shipment Tracking No: 5540 9200 4960

Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Brad Hollamon / PTS	11/10/14	1400	UPS / Pace	11/11/14	0920

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.3 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO# : 10288403

10288403

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4960

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.0 **Cooler Temp Corrected (°C):** 2.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.3 **Date and Initials of Person Examining Contents:** 11/12/14 WM

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # LA0-SS-1-110614 : 2/2 LA0-SS-1-111014 : 2/2 LA0-SS1-111014 : 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 1539 Temp: 2.0	Corrected Temp: 2.3
Time: put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: Date: 11/12/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

December 02, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10289093001	**LAO-SS-1-111314**	Water	11/13/14 11:30	11/18/14 10:20
10289093002	**LAO-SS-1-111714**	Water	11/17/14 11:35	11/18/14 10:20
10289093003	**LAO-SS-2-111714**	Water	11/17/14 12:30	11/18/14 10:20
10289093004	**LAO-SS-2T-111714**	Water	11/17/14 12:30	11/18/14 10:20
10289093005	**LAO-SS-3-111714**	Water	11/17/14 11:17	11/18/14 10:20
10289093006	**LAO-SS-4-111714**	Water	11/17/14 12:40	11/18/14 10:20

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10289093001	**LAO-SS-1-111314**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10289093002	**LAO-SS-1-111714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10289093003	**LAO-SS-2-111714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10289093004	**LAO-SS-2T-111714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10289093005	**LAO-SS-3-111714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10289093006	**LAO-SS-4-111714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 02, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/50737

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10289093001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1847276)
  - Calcium
- MSD (Lab ID: 1847277)
  - Aluminum
  - Calcium
  - Magnesium

R1: RPD value was outside control limits.

- MSD (Lab ID: 1847277)
  - Aluminum

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 02, 2014

Analyte Comments:

QC Batch: MPRP/50737

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1847276)
  - Calcium
- MSD (Lab ID: 1847277)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 02, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: December 02, 2014

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/39419

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10289168001,10289333009

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1850285)
  - Alkalinity, Total as CaCO3

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: December 02, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: December 02, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: December 02, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/21297

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10288874002,10289093005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1849295)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1849297)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1849296)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1849298)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Sample: LAO-SS-1-111314 **Lab ID: 10289093001** Collected: 11/13/14 11:30 Received: 11/18/14 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.010	0.0012	1	11/26/14 14:13	12/01/14 12:04	7429-90-5	M1,R1
Arsenic	**0.0018**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:04	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	11/26/14 14:13	12/01/14 12:04	7440-43-9	
Calcium	**110**	mg/L	0.80	0.17	20	11/26/14 14:13	12/01/14 12:18	7440-70-2	M1
Copper	**0.0052**	mg/L	0.0010	0.00022	1	11/26/14 14:13	12/01/14 12:04	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0080	1	11/26/14 14:13	12/01/14 12:04	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	11/26/14 14:13	12/01/14 12:04	7439-92-1	
Magnesium	**32.0**	mg/L	0.20	0.057	20	11/26/14 14:13	12/01/14 12:18	7439-95-4	M1
Silver	**0.00010J**	mg/L	0.00050	0.000056	1	11/26/14 14:13	12/01/14 12:04	7440-22-4	
Total Hardness by 2340B	**405**	mg/L	1.4	0.71	20	11/26/14 14:13	12/01/14 12:18		
Uranium-238	**0.0046**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:04	7440-61-1	
Zinc	**0.045**	mg/L	0.0050	0.0025	1	11/26/14 14:13	12/01/14 12:04	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/26/14 11:15	12/01/14 12:30	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Sample: LAO-SS-1-111714 **Lab ID: 10289093002** Collected: 11/17/14 11:35 Received: 11/18/14 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.016**	mg/L	0.010	0.0012	1	11/26/14 14:13	12/01/14 12:12	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:12	7440-38-2	
Cadmium	**0.00030**	mg/L	0.000080	0.000033	1	11/26/14 14:13	12/01/14 12:12	7440-43-9	
Calcium	**117**	mg/L	0.80	0.17	20	11/26/14 14:13	12/01/14 12:15	7440-70-2	
Copper	**0.011**	mg/L	0.0010	0.00022	1	11/26/14 14:13	12/01/14 12:12	7440-50-8	
Iron	**0.048J**	mg/L	0.050	0.0080	1	11/26/14 14:13	12/01/14 12:12	7439-89-6	
Lead	**0.00092**	mg/L	0.00010	0.000046	1	11/26/14 14:13	12/01/14 12:12	7439-92-1	
Magnesium	**35.0**	mg/L	0.20	0.057	20	11/26/14 14:13	12/01/14 12:15	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/26/14 14:13	12/01/14 12:12	7440-22-4	
Total Hardness by 2340B	**435**	mg/L	1.4	0.71	20	11/26/14 14:13	12/01/14 12:15		
Uranium-238	**0.0065**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:12	7440-61-1	
Zinc	**0.081**	mg/L	0.0050	0.0025	1	11/26/14 14:13	12/01/14 12:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/26/14 11:15	12/01/14 12:32	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:10		
Alkalinity, Total as CaCO3	**39.7**	mg/L	5.0	2.5	1		11/21/14 12:10		
Alkalinity,Bicarbonate (CaCO3)	**19.1**	mg/L	5.0	2.5	1		11/21/14 12:10		
Alkalinity,Carbonate (CaCO3)	**20.6**	mg/L	5.0	2.5	1		11/21/14 12:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**648**	mg/L	10.0	5.0	1		11/21/14 14:31		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		11/20/14 11:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.60**	mg/L	0.10	0.050	1		11/20/14 17:48		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Sample: LAO-SS-2-111714 **Lab ID: 10289093003** Collected: 11/17/14 12:30 Received: 11/18/14 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.19**	mg/L	0.010	0.0012	1	11/26/14 14:13	12/01/14 12:37	7429-90-5	
Arsenic	**0.031**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:37	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000033	1	11/26/14 14:13	12/01/14 12:37	7440-43-9	
Calcium	**139**	mg/L	0.80	0.17	20	11/26/14 14:13	12/01/14 12:40	7440-70-2	
Copper	**0.90**	mg/L	0.020	0.0043	20	11/26/14 14:13	12/01/14 12:40	7440-50-8	
Iron	**5.5**	mg/L	0.050	0.0080	1	11/26/14 14:13	12/01/14 12:37	7439-89-6	
Lead	**0.0086**	mg/L	0.00010	0.000046	1	11/26/14 14:13	12/01/14 12:37	7439-92-1	
Magnesium	**36.1**	mg/L	0.20	0.057	20	11/26/14 14:13	12/01/14 12:40	7439-95-4	
Silver	**0.000066J**	mg/L	0.00050	0.000056	1	11/26/14 14:13	12/01/14 12:37	7440-22-4	
Total Hardness by 2340B	**495**	mg/L	1.4	0.71	20	11/26/14 14:13	12/01/14 12:40		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:37	7440-61-1	
Zinc	**6.9**	mg/L	0.10	0.050	20	11/26/14 14:13	12/01/14 12:40	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/26/14 11:15	12/01/14 12:39	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:15		
Alkalinity, Total as CaCO3	**124**	mg/L	5.0	2.5	1		11/21/14 12:15		
Alkalinity,Bicarbonate (CaCO3)	**124**	mg/L	5.0	2.5	1		11/21/14 12:15		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**741**	mg/L	10.0	5.0	1		11/21/14 14:31		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**12.0**	mg/L	10.0	5.0	1		11/20/14 11:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.0**	mg/L	0.10	0.050	1		11/20/14 17:49		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Sample: LAO-SS-2T-111714 **Lab ID: 10289093004** Collected: 11/17/14 12:30 Received: 11/18/14 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.18**	mg/L	0.010	0.0012	1	11/26/14 14:13	12/01/14 12:42	7429-90-5	
Arsenic	**0.030**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:42	7440-38-2	
Cadmium	**0.025**	mg/L	0.000080	0.000033	1	11/26/14 14:13	12/01/14 12:42	7440-43-9	
Calcium	**139**	mg/L	0.80	0.17	20	11/26/14 14:13	12/01/14 12:45	7440-70-2	
Copper	**0.89**	mg/L	0.020	0.0043	20	11/26/14 14:13	12/01/14 12:45	7440-50-8	
Iron	**5.3**	mg/L	0.050	0.0080	1	11/26/14 14:13	12/01/14 12:42	7439-89-6	
Lead	**0.0082**	mg/L	0.00010	0.000046	1	11/26/14 14:13	12/01/14 12:42	7439-92-1	
Magnesium	**36.4**	mg/L	0.20	0.057	20	11/26/14 14:13	12/01/14 12:45	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/26/14 14:13	12/01/14 12:42	7440-22-4	
Total Hardness by 2340B	**497**	mg/L	1.4	0.71	20	11/26/14 14:13	12/01/14 12:45		
Uranium-238	**0.016**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:42	7440-61-1	
Zinc	**6.9**	mg/L	0.10	0.050	20	11/26/14 14:13	12/01/14 12:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/26/14 11:15	12/01/14 12:42	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:19		
Alkalinity, Total as CaCO3	**120**	mg/L	5.0	2.5	1		11/21/14 12:19		
Alkalinity,Bicarbonate (CaCO3)	**120**	mg/L	5.0	2.5	1		11/21/14 12:19		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**719**	mg/L	10.0	5.0	1		11/21/14 14:31		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**9.0J**	mg/L	10.0	5.0	1		11/20/14 11:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.10	0.050	1		11/20/14 17:53		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Sample: LAO-SS-3-111714 **Lab ID: 10289093005** Collected: 11/17/14 11:17 Received: 11/18/14 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.45**	mg/L	0.010	0.0012	1	11/26/14 14:13	12/01/14 12:48	7429-90-5	
Arsenic	**0.0073**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:48	7440-38-2	
Cadmium	**0.042**	mg/L	0.000080	0.000033	1	11/26/14 14:13	12/01/14 12:48	7440-43-9	
Calcium	**141**	mg/L	0.80	0.17	20	11/26/14 14:13	12/01/14 12:51	7440-70-2	
Copper	**2.6**	mg/L	0.020	0.0043	20	11/26/14 14:13	12/01/14 12:51	7440-50-8	
Iron	**14.2**	mg/L	0.050	0.0080	1	11/26/14 14:13	12/01/14 12:48	7439-89-6	
Lead	**0.0040**	mg/L	0.00010	0.000046	1	11/26/14 14:13	12/01/14 12:48	7439-92-1	
Magnesium	**36.3**	mg/L	0.20	0.057	20	11/26/14 14:13	12/01/14 12:51	7439-95-4	
Silver	**0.000071J**	mg/L	0.00050	0.000056	1	11/26/14 14:13	12/01/14 12:48	7440-22-4	
Total Hardness by 2340B	**502**	mg/L	1.4	0.71	20	11/26/14 14:13	12/01/14 12:51		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:48	7440-61-1	
Zinc	**8.6**	mg/L	0.10	0.050	20	11/26/14 14:13	12/01/14 12:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/26/14 11:15	12/01/14 12:44	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:24		
Alkalinity, Total as CaCO3	**71.1**	mg/L	5.0	2.5	1		11/21/14 12:24		
Alkalinity,Bicarbonate (CaCO3)	**71.1**	mg/L	5.0	2.5	1		11/21/14 12:24		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 12:24		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**749**	mg/L	10.0	5.0	1		11/21/14 14:31		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**32.0**	mg/L	10.0	5.0	1		11/20/14 11:22		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.7**	mg/L	0.10	0.050	1		11/20/14 17:54		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Sample: LAO-SS-4-111714 **Lab ID: 10289093006** Collected: 11/17/14 12:40 Received: 11/18/14 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	ND	mg/L	0.010	0.0012	1	11/26/14 14:13	12/01/14 12:53	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:53	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	11/26/14 14:13	12/01/14 12:53	7440-43-9	
Calcium	**0.047**	mg/L	0.040	0.0084	1	11/26/14 14:13	12/01/14 12:53	7440-70-2	
Copper	**0.00086J**	mg/L	0.0010	0.00022	1	11/26/14 14:13	12/01/14 12:53	7440-50-8	
Iron	**0.011J**	mg/L	0.050	0.0080	1	11/26/14 14:13	12/01/14 12:53	7439-89-6	
Lead	ND	mg/L	0.00010	0.000046	1	11/26/14 14:13	12/01/14 12:53	7439-92-1	
Magnesium	**0.0067J**	mg/L	0.010	0.0028	1	11/26/14 14:13	12/01/14 12:53	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	11/26/14 14:13	12/01/14 12:53	7440-22-4	
Total Hardness by 2340B	**0.15**	mg/L	0.071	0.036	1	11/26/14 14:13	12/01/14 12:53		
Uranium-238	ND	mg/L	0.00050	0.00025	1	11/26/14 14:13	12/01/14 12:53	7440-61-1	
Zinc	**0.0062**	mg/L	0.0050	0.0025	1	11/26/14 14:13	12/01/14 12:53	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	11/26/14 11:15	12/01/14 12:47	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 14:32		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		11/21/14 14:32		
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 14:32		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		11/21/14 14:32		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		11/21/14 14:31		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		11/20/14 13:16		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		11/20/14 17:58		

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: MERP/12199 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10289093001, 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

METHOD BLANK: 1848862 Matrix: Water
Associated Lab Samples: 10289093001, 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	12/01/14 12:25	

LABORATORY CONTROL SAMPLE: 1848863

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1848866 1848867

Parameter	Units	10289093002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0050	0.0049	99	99	70-130	1	20	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: MPRP/50737 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10289093001, 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

METHOD BLANK: 1847274 Matrix: Water
Associated Lab Samples: 10289093001, 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	12/01/14 11:58	
Arsenic	mg/L	ND	0.00050	12/01/14 11:58	
Cadmium	mg/L	ND	0.000080	12/01/14 11:58	
Calcium	mg/L	ND	0.040	12/01/14 11:58	
Copper	mg/L	ND	0.0010	12/01/14 11:58	
Iron	mg/L	ND	0.050	12/01/14 11:58	
Lead	mg/L	ND	0.00010	12/01/14 11:58	
Magnesium	mg/L	ND	0.010	12/01/14 11:58	
Silver	mg/L	ND	0.00050	12/01/14 11:58	
Uranium-238	mg/L	ND	0.00050	12/01/14 11:58	
Zinc	mg/L	ND	0.0050	12/01/14 11:58	

LABORATORY CONTROL SAMPLE: 1847275

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.080	100	85-115	
Arsenic	mg/L	.08	0.082	102	85-115	
Cadmium	mg/L	.08	0.085	106	85-115	
Calcium	mg/L	1	1.1	107	85-115	
Copper	mg/L	.08	0.078	98	85-115	
Iron	mg/L	1	1.1	107	85-115	
Lead	mg/L	.08	0.088	110	85-115	
Magnesium	mg/L	1	1.0	101	85-115	
Silver	mg/L	.08	0.089	111	85-115	
Uranium-238	mg/L	.08	0.082	103	85-115	
Zinc	mg/L	.08	0.089	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1847276 1847277

Parameter	Units	10289093001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	ND	.08	.08	0.068	0.34	85	427	70-130	134	20	M1,R1
Arsenic	mg/L	0.0018	.08	.08	0.085	0.084	104	103	70-130	1	20	
Cadmium	mg/L	0.00020	.08	.08	0.084	0.082	105	103	70-130	3	20	
Calcium	mg/L	110	1	1	115	114	567	454	70-130	1	20	E,M1
Copper	mg/L	0.0052	.08	.08	0.082	0.081	96	95	70-130	1	20	
Iron	mg/L	0.017J	1	1	1.1	1.1	110	105	70-130	4	20	
Lead	mg/L	0.00016	.08	.08	0.082	0.080	102	100	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1847276 1847277

Parameter	Units	10289093001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.0	1	1	33.2	33.3	121	132	70-130	0	20	M1
Silver	mg/L	0.00010J	.08	.08	0.080	0.079	100	99	70-130	2	20	
Uranium-238	mg/L	0.0046	.08	.08	0.089	0.088	106	105	70-130	1	20	
Zinc	mg/L	0.045	.08	.08	0.13	0.13	106	104	70-130	1	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: WET/39419 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

METHOD BLANK: 1850281 Matrix: Water
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Hydroxide (CaCO3)	mg/L	ND	5.0	11/21/14 11:46	
Alkalinity, Total as CaCO3	mg/L	ND	5.0	11/21/14 11:46	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	11/21/14 11:46	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	11/21/14 11:46	

LABORATORY CONTROL SAMPLE & LCSD: 1850282 1850283

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.0	42.9	107	107	90-110	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1850284 1850285

Parameter	Units	10289168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	304	40	40	348	355	110	129	80-120	2	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1850286 1850287

Parameter	Units	10289333009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	223	40	40	269	270	116	118	80-120	0	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: WET/39415 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

METHOD BLANK: 1850101 Matrix: Water
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	11/21/14 14:31	

LABORATORY CONTROL SAMPLE: 1850102

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	848	85	80-120	

SAMPLE DUPLICATE: 1850103

Parameter	Units	10289168001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	355	361	2	10	

SAMPLE DUPLICATE: 1850104

Parameter	Units	10289333009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	191	203	6	10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: WET/39377 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005

METHOD BLANK: 1848933 Matrix: Water
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	11/20/14 11:22	

LABORATORY CONTROL SAMPLE: 1848934

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	92.0	92	80-120	

SAMPLE DUPLICATE: 1848935

Parameter	Units	10288462002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	6.0J		10	H1

SAMPLE DUPLICATE: 1848936

Parameter	Units	10288961012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: WET/39378 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10289093006

METHOD BLANK: 1848938 | Matrix: Water
Associated Lab Samples: 10289093006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	11/20/14 13:16	

LABORATORY CONTROL SAMPLE: 1848939

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	88.0	88	80-120	

SAMPLE DUPLICATE: 1848940

Parameter	Units	10289093006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1848941

Parameter	Units	10289168001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

QC Batch: WETA/21297 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

METHOD BLANK: 1849293 | Matrix: Water
Associated Lab Samples: 10289093002, 10289093003, 10289093004, 10289093005, 10289093006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	11/20/14 17:25	

LABORATORY CONTROL SAMPLE: 1849294

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1849295 1849296

Parameter	Units	10288874002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	0.28	0.32	11	13	80-120	12	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1849297 1849298

Parameter	Units	10289093005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.7	2.5	2.5	3.0	3.0	51	52	80-120	1	30	M1

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289093

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10289093001	**LAO-SS-1-111314**	EPA 200.8	MPRP/50737	EPA 200.8	ICPM/22598
10289093002	**LAO-SS-1-111714**	EPA 200.8	MPRP/50737	EPA 200.8	ICPM/22598
10289093003	**LAO-SS-2-111714**	EPA 200.8	MPRP/50737	EPA 200.8	ICPM/22598
10289093004	**LAO-SS-2T-111714**	EPA 200.8	MPRP/50737	EPA 200.8	ICPM/22598
10289093005	**LAO-SS-3-111714**	EPA 200.8	MPRP/50737	EPA 200.8	ICPM/22598
10289093006	**LAO-SS-4-111714**	EPA 200.8	MPRP/50737	EPA 200.8	ICPM/22598
10289093001	**LAO-SS-1-111314**	EPA 245.1	MERP/12199	EPA 245.1	MERC/14142
10289093002	**LAO-SS-1-111714**	EPA 245.1	MERP/12199	EPA 245.1	MERC/14142
10289093003	**LAO-SS-2-111714**	EPA 245.1	MERP/12199	EPA 245.1	MERC/14142
10289093004	**LAO-SS-2T-111714**	EPA 245.1	MERP/12199	EPA 245.1	MERC/14142
10289093005	**LAO-SS-3-111714**	EPA 245.1	MERP/12199	EPA 245.1	MERC/14142
10289093006	**LAO-SS-4-111714**	EPA 245.1	MERP/12199	EPA 245.1	MERC/14142
10289093002	**LAO-SS-1-111714**	SM 2320B	WET/39419		
10289093003	**LAO-SS-2-111714**	SM 2320B	WET/39419		
10289093004	**LAO-SS-2T-111714**	SM 2320B	WET/39419		
10289093005	**LAO-SS-3-111714**	SM 2320B	WET/39419		
10289093006	**LAO-SS-4-111714**	SM 2320B	WET/39419		
10289093002	**LAO-SS-1-111714**	SM 2540C	WET/39415		
10289093003	**LAO-SS-2-111714**	SM 2540C	WET/39415		
10289093004	**LAO-SS-2T-111714**	SM 2540C	WET/39415		
10289093005	**LAO-SS-3-111714**	SM 2540C	WET/39415		
10289093006	**LAO-SS-4-111714**	SM 2540C	WET/39415		
10289093002	**LAO-SS-1-111714**	SM 2540D	WET/39377		
10289093003	**LAO-SS-2-111714**	SM 2540D	WET/39377		
10289093004	**LAO-SS-2T-111714**	SM 2540D	WET/39377		
10289093005	**LAO-SS-3-111714**	SM 2540D	WET/39377		
10289093006	**LAO-SS-4-111714**	SM 2540D	WET/39378		
10289093002	**LAO-SS-1-111714**	SM 4500-NO3 H	WETA/21297		
10289093003	**LAO-SS-2-111714**	SM 4500-NO3 H	WETA/21297		
10289093004	**LAO-SS-2T-111714**	SM 4500-NO3 H	WETA/21297		
10289093005	**LAO-SS-3-111714**	SM 4500-NO3 H	WETA/21297		
10289093006	**LAO-SS-4-111714**	SM 4500-NO3 H	WETA/21297		

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10289093

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	TDS/TSS/Alkalinity	N.Nitrate/N.Nitrite					Comments
	LAO-SS-1-111314	11/13/14	11:30		X			2			2				X			X								001
	LAO-SS-1-111714	11/17/14	11:35		X			4	1	1	2				X			X	X	X						002
	LAO-SS-2-111714	11/17/14	12:30		X			3	1	1	1				X				X	X						003
	LAO-SS-2T-111714	11/17/14	12:30		X			3	1	1	1				X				X	X						004
	LAO-SS-3-111714	11/17/14	11:17		X			3	1	1	1				X				X	X						005
	LAO-SS-4-111714	11/17/14	12:40		X			3	1	1	1				X				X	X						006

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: B. Holkman, T. Haley						
Sampler's Company: Pioneer Technical Services	PTS	11/17/14	1430	WM/Pace	11/18/14	1020
Shipment Method: Fed Ex Ship Date: 11/17/14						
Shipment Tracking No: 5540 9200 4927						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4-2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP

Project #: WO#: 10289093

10289093

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4927

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ B88A9130516413 ☐ B88A912167504 ☒ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 **Cooler Temp Corrected (°C):** 4.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.3 **Date and Initials of Person Examining Contents:** 11/18/14 WDM

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☒ No	☐ N/A	11. Doesn't specify whether filtered or not
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☒ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1 2/2 2 2/2 2-6: 1/1 3-6 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 1405 Temp: 3.9	Corrected Temp: 4.2
Time: 1407 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: **Date:** 11/19/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

December 12, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on November 25, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10289895001	**LAO-SS-1-112014**	Water	11/20/14 10:30	11/25/14 12:18
10289895002	**LAO-SS-1-112414**	Water	11/24/14 13:40	11/25/14 12:18
10289895003	**LAO-SS-2-112414**	Water	11/24/14 14:55	11/25/14 12:18

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10289895001	**LAO-SS-1-112014**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10289895002	**LAO-SS-1-112414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10289895003	**LAO-SS-2-112414**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 12, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/51085

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10289895001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1859884)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1859885)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 12, 2014

Analyte Comments:

QC Batch: MPRP/51085

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1859884)
  - Calcium
- MSD (Lab ID: 1859885)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 12, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Sample: LAO-SS-1-112014 **Lab ID: 10289895001** Collected: 11/20/14 10:30 Received: 11/25/14 12:18 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0041J**	mg/L	0.010	0.0012	1	12/09/14 10:20	12/10/14 18:32	7429-90-5	
Arsenic	**0.0021**	mg/L	0.00050	0.00025	1	12/09/14 10:20	12/10/14 18:32	7440-38-2	B
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	12/09/14 10:20	12/10/14 18:32	7440-43-9	
Calcium	**116**	mg/L	0.40	0.084	10	12/09/14 10:20	12/10/14 18:57	7440-70-2	M1
Copper	**0.0075**	mg/L	0.0050	0.0011	5	12/09/14 10:20	12/11/14 11:37	7440-50-8	
Iron	**0.017J**	mg/L	0.050	0.0080	1	12/09/14 10:20	12/10/14 18:32	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	12/09/14 10:20	12/10/14 18:32	7439-92-1	
Magnesium	**34.2**	mg/L	0.10	0.028	10	12/09/14 10:20	12/10/14 18:57	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	12/09/14 10:20	12/10/14 18:32	7440-22-4	
Total Hardness by 2340B	**431**	mg/L	0.71	0.36	10	12/09/14 10:20	12/10/14 18:57		
Uranium-238	**0.0073**	mg/L	0.00050	0.00025	1	12/09/14 10:20	12/10/14 18:32	7440-61-1	
Zinc	**0.058**	mg/L	0.0050	0.0025	1	12/09/14 10:20	12/10/14 18:32	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/05/14 11:15	12/05/14 12:28	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Sample: LAO-SS-1-112414 **Lab ID: 10289895002** Collected: 11/24/14 13:40 Received: 11/25/14 12:18 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0038J**	mg/L	0.010	0.0012	1	12/09/14 10:20	12/10/14 19:12	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.00025	1	12/09/14 10:20	12/10/14 19:12	7440-38-2	B
Cadmium	**0.00017**	mg/L	0.000080	0.000033	1	12/09/14 10:20	12/10/14 19:12	7440-43-9	
Calcium	**107**	mg/L	0.40	0.084	10	12/09/14 10:20	12/10/14 19:17	7440-70-2	
Copper	**0.0066**	mg/L	0.0050	0.0011	5	12/09/14 10:20	12/11/14 11:32	7440-50-8	
Iron	**0.015J**	mg/L	0.050	0.0080	1	12/09/14 10:20	12/10/14 19:12	7439-89-6	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	12/09/14 10:20	12/10/14 19:12	7439-92-1	
Magnesium	**31.8**	mg/L	0.10	0.028	10	12/09/14 10:20	12/10/14 19:17	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/09/14 10:20	12/10/14 19:12	7440-22-4	
Total Hardness by 2340B	**398**	mg/L	0.71	0.36	10	12/09/14 10:20	12/10/14 19:17		
Uranium-238	**0.0074**	mg/L	0.00050	0.00025	1	12/09/14 10:20	12/10/14 19:12	7440-61-1	
Zinc	**0.052**	mg/L	0.0050	0.0025	1	12/09/14 10:20	12/10/14 19:12	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/05/14 11:15	12/05/14 12:30	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Sample: LAO-SS-2-112414 **Lab ID: 10289895003** Collected: 11/24/14 14:55 Received: 11/25/14 12:18 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.27**	mg/L	0.010	0.0012	1	12/09/14 10:20	12/10/14 18:07	7429-90-5	
Arsenic	**0.030**	mg/L	0.00050	0.00025	1	12/09/14 10:20	12/10/14 18:07	7440-38-2	
Cadmium	**0.024**	mg/L	0.000080	0.000033	1	12/09/14 10:20	12/10/14 18:07	7440-43-9	
Calcium	**131**	mg/L	0.40	0.084	10	12/09/14 10:20	12/10/14 18:12	7440-70-2	
Copper	**1.0**	mg/L	0.050	0.011	50	12/09/14 10:20	12/11/14 11:03	7440-50-8	
Iron	**5.3**	mg/L	0.050	0.0080	1	12/09/14 10:20	12/10/14 18:07	7439-89-6	
Lead	**0.010**	mg/L	0.00010	0.000046	1	12/09/14 10:20	12/10/14 18:07	7439-92-1	
Magnesium	**35.1**	mg/L	0.10	0.028	10	12/09/14 10:20	12/10/14 18:12	7439-95-4	
Silver	**0.000099J**	mg/L	0.00050	0.000056	1	12/09/14 10:20	12/10/14 18:07	7440-22-4	
Total Hardness by 2340B	**472**	mg/L	0.71	0.36	10	12/09/14 10:20	12/10/14 18:12		
Uranium-238	**0.014**	mg/L	0.00050	0.00025	1	12/09/14 10:20	12/10/14 18:07	7440-61-1	
Zinc	**6.5**	mg/L	0.25	0.12	50	12/09/14 10:20	12/11/14 11:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/05/14 11:15	12/05/14 12:33	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

QC Batch: MERP/12243 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10289895001, 10289895002, 10289895003

METHOD BLANK: 1854836 Matrix: Water
Associated Lab Samples: 10289895001, 10289895002, 10289895003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	12/05/14 12:23	

LABORATORY CONTROL SAMPLE: 1854837

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0052	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1854838 1854839

Parameter	Units	10289895003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0054	0.0054	107	107	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

QC Batch: MPRP/51085 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10289895001, 10289895002, 10289895003

METHOD BLANK: 1859882 Matrix: Water
Associated Lab Samples: 10289895001, 10289895002, 10289895003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	0.0019J	0.010	12/11/14 10:53	
Arsenic	mg/L	ND	0.00050	12/11/14 10:53	
Cadmium	mg/L	ND	0.000080	12/11/14 10:53	
Calcium	mg/L	ND	0.040	12/11/14 10:53	
Copper	mg/L	ND	0.0010	12/11/14 10:53	
Iron	mg/L	ND	0.050	12/11/14 10:53	
Lead	mg/L	ND	0.00010	12/11/14 10:53	
Magnesium	mg/L	ND	0.010	12/11/14 10:53	
Silver	mg/L	ND	0.00050	12/11/14 10:53	
Uranium-238	mg/L	ND	0.00050	12/11/14 10:53	
Zinc	mg/L	ND	0.0050	12/11/14 10:53	

LABORATORY CONTROL SAMPLE: 1859883

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.078	97	85-115	
Arsenic	mg/L	.08	0.077	96	85-115	
Cadmium	mg/L	.08	0.078	97	85-115	
Calcium	mg/L	1	0.96	96	85-115	
Copper	mg/L	.08	0.083	104	85-115	
Iron	mg/L	1	0.98	98	85-115	
Lead	mg/L	.08	0.078	98	85-115	
Magnesium	mg/L	1	1.0	101	85-115	
Silver	mg/L	.08	0.078	98	85-115	
Uranium-238	mg/L	.08	0.084	105	85-115	
Zinc	mg/L	.08	0.078	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1859884 1859885

Parameter	Units	10289895001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0041J	.08	.08	0.090	0.090	107	107	70-130	0	20	
Arsenic	mg/L	0.0021	.08	.08	0.084	0.080	103	97	70-130	6	20	
Cadmium	mg/L	0.00020	.08	.08	0.080	0.078	100	98	70-130	3	20	
Calcium	mg/L	116	1	1	116	113	12	-308	70-130	3	20	E,M1
Copper	mg/L	0.0075	.08	.08	0.093	0.092	107	105	70-130	1	20	
Iron	mg/L	0.017J	1	1	1.0	1.0	100	99	70-130	1	20	
Lead	mg/L	0.00015	.08	.08	0.078	0.078	98	97	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1859884 1859885

Parameter	Units	10289895001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	34.2	1	1	34.6	34.1	39	-12	70-130	1	20	M1
Silver	mg/L	ND	.08	.08	0.071	0.079	88	98	70-130	11	20	
Uranium-238	mg/L	0.0073	.08	.08	0.084	0.084	96	96	70-130	0	20	
Zinc	mg/L	0.058	.08	.08	0.14	0.14	104	100	70-130	2	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10289895

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10289895001	**LAO-SS-1-112014**	EPA 200.8	MPRP/51085	EPA 200.8	ICPM/22707
10289895002	**LAO-SS-1-112414**	EPA 200.8	MPRP/51085	EPA 200.8	ICPM/22707
10289895003	**LAO-SS-2-112414**	EPA 200.8	MPRP/51085	EPA 200.8	ICPM/22707
10289895001	**LAO-SS-1-112014**	EPA 245.1	MERP/12243	EPA 245.1	MERC/14210
10289895002	**LAO-SS-1-112414**	EPA 245.1	MERP/12243	EPA 245.1	MERC/14210
10289895003	**LAO-SS-2-112414**	EPA 245.1	MERP/12243	EPA 245.1	MERC/14210

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** 10289895

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	LAO-SS-1 - 112014	11/20/14	10:30		X						2				X	X	001
	LAO-SS-1 - 112414	11/24/14	1340		X						2				X	X	002
	LAO-SS-2 - 112414	11/24/14	1455		X						1				X		003

Sampler's Name: B. Hollaman, T. Hickey	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] / PTS	11/24/14	1530	[signature]	11/25/14	12:18
Shipment Method: Fed Ex Ship Date: 11/24/14						
Shipment Tracking No: 5540920074938						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place (Yes) / No | Temp Blank: Yes / (No) | Cooler Temp on Receipt: 5.1 °F/C | Trip Blank: Yes / (No) | MS/MSD Sample Submitted: Yes / (No)

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer Technical Services **Project #:** WO#: 10289895

10289895

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4938

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.8 **Cooler Temp Corrected (°C):** 5.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.3 **Date and Initials of Person Examining Contents:** JP 11/25/14

Comments:

Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1 2 3 / 2/2 2/2 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time:	Temp:	Corrected Temp:
Time:	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 11/26/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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December 10, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on December 02, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10290312001	**LAO-SS-1-112714**	Water	11/27/14 09:45	12/02/14 10:00
10290312002	**LAO-SS-1-120114**	Water	12/01/14 11:30	12/02/14 10:00
10290312003	**LAO-SS-2-120114**	Water	12/01/14 12:20	12/02/14 10:00

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10290312001	**LAO-SS-1-112714**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10290312002	**LAO-SS-1-120114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10290312003	**LAO-SS-2-120114**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 10, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/50998

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10290312001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1857412)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1857413)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 10, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Sample: LAO-SS-1-112714 **Lab ID: 10290312001** Collected: 11/27/14 09:45 Received: 12/02/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0024J**	mg/L	0.010	0.0012	1	12/09/14 10:22	12/09/14 13:29	7429-90-5	
Arsenic	**0.0022**	mg/L	0.00050	0.00025	1	12/09/14 10:22	12/09/14 13:29	7440-38-2	
Cadmium	**0.00020**	mg/L	0.000080	0.000033	1	12/09/14 10:22	12/09/14 13:29	7440-43-9	
Calcium	**106**	mg/L	0.80	0.17	20	12/09/14 10:22	12/09/14 13:43	7440-70-2	M1
Copper	**0.0064**	mg/L	0.0010	0.00022	1	12/09/14 10:22	12/09/14 13:29	7440-50-8	
Iron	**0.014J**	mg/L	0.050	0.0080	1	12/09/14 10:22	12/09/14 13:29	7439-89-6	
Lead	**0.00017**	mg/L	0.00010	0.000046	1	12/09/14 10:22	12/09/14 13:29	7439-92-1	
Magnesium	**32.7**	mg/L	0.20	0.057	20	12/09/14 10:22	12/09/14 13:43	7439-95-4	M1
Silver	**0.00016J**	mg/L	0.00050	0.000056	1	12/09/14 10:22	12/09/14 13:29	7440-22-4	
Total Hardness by 2340B	**399**	mg/L	1.4	0.71	20	12/09/14 10:22	12/09/14 13:43		
Uranium-238	**0.0070**	mg/L	0.00050	0.00025	1	12/09/14 10:22	12/09/14 13:29	7440-61-1	
Zinc	**0.049**	mg/L	0.0050	0.0025	1	12/09/14 10:22	12/09/14 13:29	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/08/14 11:55	12/09/14 11:57	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Sample: LAO-SS-1-120114 **Lab ID: 10290312002** Collected: 12/01/14 11:30 Received: 12/02/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0028J**	mg/L	0.010	0.0012	1	12/09/14 10:22	12/09/14 14:00	7429-90-5	
Arsenic	**0.0019**	mg/L	0.00050	0.00025	1	12/09/14 10:22	12/09/14 14:00	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	12/09/14 10:22	12/09/14 14:00	7440-43-9	
Calcium	**108**	mg/L	0.80	0.17	20	12/09/14 10:22	12/09/14 14:02	7440-70-2	
Copper	**0.0076**	mg/L	0.0010	0.00022	1	12/09/14 10:22	12/09/14 14:00	7440-50-8	
Iron	**0.012J**	mg/L	0.050	0.0080	1	12/09/14 10:22	12/09/14 14:00	7439-89-6	
Lead	**0.00015**	mg/L	0.00010	0.000046	1	12/09/14 10:22	12/09/14 14:00	7439-92-1	
Magnesium	**32.8**	mg/L	0.20	0.057	20	12/09/14 10:22	12/09/14 14:02	7439-95-4	
Silver	**0.000066J**	mg/L	0.00050	0.000056	1	12/09/14 10:22	12/09/14 14:00	7440-22-4	
Total Hardness by 2340B	**405**	mg/L	1.4	0.71	20	12/09/14 10:22	12/09/14 14:02		
Uranium-238	**0.0056**	mg/L	0.00050	0.00025	1	12/09/14 10:22	12/09/14 14:00	7440-61-1	
Zinc	**0.041**	mg/L	0.0050	0.0025	1	12/09/14 10:22	12/09/14 14:00	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/08/14 11:55	12/09/14 11:59	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Sample: LAO-SS-2-120114 **Lab ID: 10290312003** Collected: 12/01/14 12:20 Received: 12/02/14 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.10**	mg/L	0.010	0.0012	1	12/09/14 10:22	12/09/14 14:05	7429-90-5	
Arsenic	**0.014**	mg/L	0.00050	0.00025	1	12/09/14 10:22	12/09/14 14:05	7440-38-2	
Cadmium	**0.021**	mg/L	0.000080	0.000033	1	12/09/14 10:22	12/09/14 14:05	7440-43-9	
Calcium	**132**	mg/L	0.80	0.17	20	12/09/14 10:22	12/09/14 14:08	7440-70-2	
Copper	**0.57**	mg/L	0.020	0.0043	20	12/09/14 10:22	12/09/14 14:08	7440-50-8	
Iron	**2.9**	mg/L	0.050	0.0080	1	12/09/14 10:22	12/09/14 14:05	7439-89-6	
Lead	**0.0048**	mg/L	0.00010	0.000046	1	12/09/14 10:22	12/09/14 14:05	7439-92-1	
Magnesium	**35.8**	mg/L	0.20	0.057	20	12/09/14 10:22	12/09/14 14:08	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/09/14 10:22	12/09/14 14:05	7440-22-4	
Total Hardness by 2340B	**476**	mg/L	1.4	0.71	20	12/09/14 10:22	12/09/14 14:08		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	12/09/14 10:22	12/09/14 14:05	7440-61-1	
Zinc	**6.4**	mg/L	0.10	0.050	20	12/09/14 10:22	12/09/14 14:08	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/08/14 11:55	12/09/14 12:01	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

QC Batch: MERP/12281 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10290312001, 10290312002, 10290312003

METHOD BLANK: 1857479 Matrix: Water
Associated Lab Samples: 10290312001, 10290312002, 10290312003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	12/09/14 11:52	

LABORATORY CONTROL SAMPLE: 1857480

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0053	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1857481 1857482

Parameter	Units	10290312003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0057	0.0058	113	115	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

QC Batch: MPRP/50998 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10290312001, 10290312002, 10290312003

METHOD BLANK: 1857410 Matrix: Water
Associated Lab Samples: 10290312001, 10290312002, 10290312003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	12/09/14 13:24	
Arsenic	mg/L	ND	0.00050	12/09/14 13:24	
Cadmium	mg/L	ND	0.000080	12/09/14 13:24	
Calcium	mg/L	ND	0.040	12/09/14 13:24	
Copper	mg/L	ND	0.0010	12/09/14 13:24	
Iron	mg/L	ND	0.050	12/09/14 13:24	
Lead	mg/L	ND	0.00010	12/09/14 13:24	
Magnesium	mg/L	ND	0.010	12/09/14 13:24	
Silver	mg/L	ND	0.00050	12/09/14 13:24	
Uranium-238	mg/L	ND	0.00050	12/09/14 13:24	
Zinc	mg/L	ND	0.0050	12/09/14 13:24	

LABORATORY CONTROL SAMPLE: 1857411

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.080	100	85-115	
Arsenic	mg/L	.08	0.079	99	85-115	
Cadmium	mg/L	.08	0.082	102	85-115	
Calcium	mg/L	1	0.96	96	85-115	
Copper	mg/L	.08	0.086	107	85-115	
Iron	mg/L	1	1.1	110	85-115	
Lead	mg/L	.08	0.087	109	85-115	
Magnesium	mg/L	1	1.1	109	85-115	
Silver	mg/L	.08	0.083	104	85-115	
Uranium-238	mg/L	.08	0.083	104	85-115	
Zinc	mg/L	.08	0.083	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1857412 1857413

Parameter	Units	10290312001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0024J	.08	.08	0.087	0.087	106	106	70-130	0	20	
Arsenic	mg/L	0.0022	.08	.08	0.084	0.083	102	101	70-130	1	20	
Cadmium	mg/L	0.00020	.08	.08	0.084	0.083	104	104	70-130	0	20	
Calcium	mg/L	106	1	1	112	112	603	587	70-130	0	20	M1
Copper	mg/L	0.0064	.08	.08	0.093	0.091	108	106	70-130	2	20	
Iron	mg/L	0.014J	1	1	1.2	1.1	114	113	70-130	1	20	
Lead	mg/L	0.00017	.08	.08	0.088	0.084	110	105	70-130	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1857412 1857413

Parameter	Units	10290312001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.7	1	1	34.2	34.7	148	202	70-130	2	20	M1
Silver	mg/L	0.00016J	.08	.08	0.079	0.078	98	97	70-130	1	20	
Uranium-238	mg/L	0.0070	.08	.08	0.096	0.096	112	111	70-130	1	20	
Zinc	mg/L	0.049	.08	.08	0.14	0.14	111	110	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10290312

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10290312001	**LAO-SS-1-112714**	EPA 200.8	MPRP/50998	EPA 200.8	ICPM/22703
10290312002	**LAO-SS-1-120114**	EPA 200.8	MPRP/50998	EPA 200.8	ICPM/22703
10290312003	**LAO-SS-2-120114**	EPA 200.8	MPRP/50998	EPA 200.8	ICPM/22703
10290312001	**LAO-SS-1-112714**	EPA 245.1	MERP/12281	EPA 245.1	MERC/14235
10290312002	**LAO-SS-1-120114**	EPA 245.1	MERP/12281	EPA 245.1	MERC/14235
10290312003	**LAO-SS-2-120114**	EPA 245.1	MERP/12281	EPA 245.1	MERC/14235

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10290312

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

BP Facility No: LAO Wetlands (Weekly)

Req Due Date (mm/dd/yy): _____

Lab Work Order Number: _____

Page ____ of ____

Rush TAT: Yes ____ No x

Lab Name:	Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM:	Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:		Stage: Activity:	Invoice To: BP x Contractor ____
BP Project Manager (PM):	Shannon Dunlap		
BP PM Phone:	406-782-3964		
BP PM Email:			

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Requested Analyses: Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments (Report Type & QC Level: Standard x; Full Data Package ____)
	LAO-SS-1 - 112714	11/27/14	9:45		x						2				x			x							001
	LAO-SS-1 - 120114	12/01/14	11:30		x						2				x			x							002
	LAO-SS-2 - 120114	12/01/14	12:20		x						1				x										003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

Sampler's Name:	T. Hockey	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date / Time
Sampler's Company:	Pioneer Technical Services	[signature] / PTS	12/1/14	1300	[signature] / Pace	12/2/14 1000
Shipment Method:	FedEx Ship Date: 12/1/14					
Shipment Tracking No:	554092004950					

Special Instructions:

THIS LINE - LAB USE ONLY. Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____°F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP rm – Mt Silver Bar

Project #: WO#: 10290312

10290312

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other: _____

Tracking Number: 5540 9200 4950

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: _____ **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.6 **Cooler Temp Corrected (°C):** 4.7 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** 12/2/14 wpm

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☒ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1,2 : 2/2 3 : 1/1
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1600	Temp: ~~4.6~~ 12/2/14 wpm	Corrected Temp: 4.7
Time:	put in cooler 1605	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 12/3/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

December 18, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on December 09, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10291008001	**LAO-SS-1-120414**	Water	12/04/14 11:30	12/09/14 10:10
10291008002	**LAO-SS-1-120814**	Water	12/08/14 10:30	12/09/14 10:10
10291008003	**LAO-SS-2-120814**	Water	12/08/14 11:45	12/09/14 10:10

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10291008001	**LAO-SS-1-120414**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10291008002	**LAO-SS-1-120814**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10291008003	**LAO-SS-2-120814**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 18, 2014

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MPRP/51130

B: Analyte was detected in the associated method blank.

- BLANK for HBN 332639 [MPRP/511 (Lab ID: 1861171)
  - Lead

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/51130

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10291008001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1861551)
  - Calcium
- MSD (Lab ID: 1861552)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 18, 2014

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Sample: LAO-SS-1-120414 **Lab ID: 10291008001** Collected: 12/04/14 11:30 Received: 12/09/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.019**	mg/L	0.010	0.0012	1	12/10/14 21:16	12/11/14 10:20	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.00025	1	12/10/14 21:16	12/11/14 10:20	7440-38-2	
Cadmium	**0.00025**	mg/L	0.000080	0.000033	1	12/10/14 21:16	12/11/14 10:20	7440-43-9	
Calcium	**105**	mg/L	0.80	0.17	20	12/10/14 21:16	12/11/14 10:28	7440-70-2	M1
Copper	**0.011**	mg/L	0.0010	0.00022	1	12/10/14 21:16	12/11/14 10:20	7440-50-8	
Iron	**0.035J**	mg/L	0.050	0.0080	1	12/10/14 21:16	12/11/14 10:20	7439-89-6	
Lead	**0.00069**	mg/L	0.00010	0.000046	1	12/10/14 21:16	12/11/14 10:20	7439-92-1	
Magnesium	**32.4**	mg/L	0.20	0.057	20	12/10/14 21:16	12/11/14 10:28	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	12/10/14 21:16	12/11/14 10:20	7440-22-4	
Total Hardness by 2340B	**395**	mg/L	1.4	0.71	20	12/10/14 21:16	12/11/14 10:28		
Uranium-238	**0.0051**	mg/L	0.00050	0.00025	1	12/10/14 21:16	12/11/14 10:20	7440-61-1	
Zinc	**0.056**	mg/L	0.0050	0.0025	1	12/10/14 21:16	12/11/14 10:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/12/14 11:15	12/16/14 11:41	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Sample: LAO-SS-1-120814 **Lab ID: 10291008002** Collected: 12/08/14 10:30 Received: 12/09/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0024J**	mg/L	0.010	0.0012	1	12/10/14 21:16	12/11/14 10:42	7429-90-5	
Arsenic	**0.0018**	mg/L	0.00050	0.00025	1	12/10/14 21:16	12/11/14 10:42	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	12/10/14 21:16	12/11/14 10:42	7440-43-9	
Calcium	**104**	mg/L	0.80	0.17	20	12/10/14 21:16	12/11/14 10:45	7440-70-2	
Copper	**0.0058**	mg/L	0.0010	0.00022	1	12/10/14 21:16	12/11/14 10:42	7440-50-8	
Iron	**0.012J**	mg/L	0.050	0.0080	1	12/10/14 21:16	12/11/14 10:42	7439-89-6	
Lead	**0.000083J**	mg/L	0.00010	0.000046	1	12/10/14 21:16	12/11/14 10:42	7439-92-1	B
Magnesium	**32.2**	mg/L	0.20	0.057	20	12/10/14 21:16	12/11/14 10:45	7439-95-4	
Silver	**0.00013J**	mg/L	0.00050	0.000056	1	12/10/14 21:16	12/11/14 10:42	7440-22-4	
Total Hardness by 2340B	**393**	mg/L	1.4	0.71	20	12/10/14 21:16	12/11/14 10:45		
Uranium-238	**0.0056**	mg/L	0.00050	0.00025	1	12/10/14 21:16	12/11/14 10:42	7440-61-1	
Zinc	**0.042**	mg/L	0.0050	0.0025	1	12/10/14 21:16	12/11/14 10:42	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/12/14 11:15	12/16/14 11:44	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Sample: LAO-SS-2-120814 **Lab ID: 10291008003** Collected: 12/08/14 11:45 Received: 12/09/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.097**	mg/L	0.010	0.0012	1	12/10/14 21:16	12/11/14 10:48	7429-90-5	
Arsenic	**0.013**	mg/L	0.00050	0.00025	1	12/10/14 21:16	12/11/14 10:48	7440-38-2	
Cadmium	**0.021**	mg/L	0.000080	0.000033	1	12/10/14 21:16	12/11/14 10:48	7440-43-9	
Calcium	**132**	mg/L	0.80	0.17	20	12/10/14 21:16	12/11/14 10:51	7440-70-2	
Copper	**0.49**	mg/L	0.020	0.0043	20	12/10/14 21:16	12/11/14 10:51	7440-50-8	
Iron	**2.4**	mg/L	0.050	0.0080	1	12/10/14 21:16	12/11/14 10:48	7439-89-6	
Lead	**0.0046**	mg/L	0.00010	0.000046	1	12/10/14 21:16	12/11/14 10:48	7439-92-1	
Magnesium	**40.6**	mg/L	0.20	0.057	20	12/10/14 21:16	12/11/14 10:51	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/10/14 21:16	12/11/14 10:48	7440-22-4	
Total Hardness by 2340B	**496**	mg/L	1.4	0.71	20	12/10/14 21:16	12/11/14 10:51		
Uranium-238	**0.013**	mg/L	0.00050	0.00025	1	12/10/14 21:16	12/11/14 10:48	7440-61-1	
Zinc	**6.1**	mg/L	0.10	0.050	20	12/10/14 21:16	12/11/14 10:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/12/14 11:15	12/16/14 11:46	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

QC Batch: MERP/12325 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10291008001, 10291008002, 10291008003

METHOD BLANK: 1861220 Matrix: Water
Associated Lab Samples: 10291008001, 10291008002, 10291008003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	12/16/14 11:12	

LABORATORY CONTROL SAMPLE: 1861221

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1861222 1861223

Parameter	Units	10290815001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	3.0 ug/L	.015	.015	0.018	0.018	101	98	70-130	3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

QC Batch: MPRP/51130 | Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 | Analysis Description: 200.8 MET
Associated Lab Samples: 10291008001, 10291008002, 10291008003

METHOD BLANK: 1861171 | Matrix: Water
Associated Lab Samples: 10291008001, 10291008002, 10291008003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	12/11/14 10:06	
Arsenic	mg/L	ND	0.00050	12/11/14 10:06	
Cadmium	mg/L	ND	0.000080	12/11/14 10:06	
Calcium	mg/L	ND	0.040	12/11/14 10:06	
Copper	mg/L	ND	0.0010	12/11/14 10:06	
Iron	mg/L	ND	0.050	12/11/14 10:06	
Lead	mg/L	0.000056J	0.00010	12/11/14 10:06	
Magnesium	mg/L	ND	0.010	12/11/14 10:06	
Silver	mg/L	ND	0.00050	12/11/14 10:06	
Uranium-238	mg/L	ND	0.00050	12/11/14 10:06	
Zinc	mg/L	ND	0.0050	12/11/14 10:06	

LABORATORY CONTROL SAMPLE: 1861172

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.085	106	85-115	
Arsenic	mg/L	.08	0.085	106	85-115	
Cadmium	mg/L	.08	0.079	99	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.085	106	85-115	
Iron	mg/L	1	1.1	109	85-115	
Lead	mg/L	.08	0.085	106	85-115	
Magnesium	mg/L	1	1.1	107	85-115	
Silver	mg/L	.08	0.083	103	85-115	
Uranium-238	mg/L	.08	0.081	101	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1861551 1861552

Parameter	Units	10291008001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.019	.08	.08	0.098	0.10	99	103	70-130	4	20	
Arsenic	mg/L	0.0020	.08	.08	0.084	0.083	102	101	70-130	1	20	
Cadmium	mg/L	0.00025	.08	.08	0.075	0.076	93	94	70-130	1	20	
Calcium	mg/L	105	1	1	108	107	284	181	70-130	1	20	M1
Copper	mg/L	0.011	.08	.08	0.091	0.090	99	98	70-130	1	20	
Iron	mg/L	0.035J	1	1	1.1	1.1	106	106	70-130	0	20	
Lead	mg/L	0.00069	.08	.08	0.079	0.079	98	98	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1861551 1861552

Parameter	Units	10291008001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	32.4	1	1	33.4	32.7	96	31	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.074	0.074	93	93	70-130	0	20	
Uranium-238	mg/L	0.0051	.08	.08	0.081	0.080	95	93	70-130	2	20	
Zinc	mg/L	0.056	.08	.08	0.14	0.13	100	98	70-130	1	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291008

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10291008001	**LAO-SS-1-120414**	EPA 200.8	MPRP/51130	EPA 200.8	ICPM/22730
10291008002	**LAO-SS-1-120814**	EPA 200.8	MPRP/51130	EPA 200.8	ICPM/22730
10291008003	**LAO-SS-2-120814**	EPA 200.8	MPRP/51130	EPA 200.8	ICPM/22730
10291008001	**LAO-SS-1-120414**	EPA 245.1	MERP/12325	EPA 245.1	MERC/14288
10291008002	**LAO-SS-1-120814**	EPA 245.1	MERP/12325	EPA 245.1	MERC/14288
10291008003	**LAO-SS-2-120814**	EPA 245.1	MERP/12325	EPA 245.1	MERC/14288

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No x

BP Facility No: LAO Wetlands (Weekly) **Lab Work Order Number:** L0291008

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1-120414	12/4/14	1130		X						2				X			X							001
	LAO-SS-1-120814	12/8/14	1030		X						2				X			X							002
	LAO-SS-2-120814	12/8/14	1145		X						1				X										003

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: D Renz, T Hickey						
Sampler's Company: Pioneer Technical Services	[signature] / PTS	12/8/14	1330	[signature] / PACE	12/9/14	10:10
Shipment Method: FedEx Ship Date: 12/8/14						
Shipment Tracking No: 554092004949						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.0 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP Pioneer

Project #: WO#: 10291008

10291008

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 5540 9200 4949

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermom. Used: ☒ B88A9130516413 ☐ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.0 **Cooler Temp Corrected (°C):** 2.0 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ NA

Temp should be above freezing to 6°C **Correction Factor:** TRUE **Date and Initials of Person Examining Contents:** JP 12/18/14

Comments:

Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 1 2 3 2/2 2/2 1/1
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time:	Temp:	Corrected Temp:
Time:	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 12/9/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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December 29, 2014

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on December 16, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10291754001	**LAO-SS-1-121114**	Water	12/11/14 15:40	12/16/14 10:25
10291754002	**LAO-SS-1-121514**	Water	12/15/14 11:05	12/16/14 10:25
10291754003	**LAO-SS-2-121514**	Water	12/15/14 11:30	12/16/14 10:25
10291754004	**LAO-SS-1T-121514**	Water	12/15/14 11:05	12/16/14 10:25
10291754005	**LAO-SS-3-121514**	Water	12/15/14 10:40	12/16/14 10:25
10291754006	**LAO-SS-4-121514**	Water	12/15/14 12:00	12/16/14 10:25
10291754007	**LAO-SS-SBC-01-121514**	Water	12/15/14 11:10	12/16/14 10:25
10291754008	**LAO-SS-06F-121514**	Water	12/15/14 10:55	12/16/14 10:25
10291754009	**LAO-SS-06G-121514**	Water	12/15/14 10:50	12/16/14 10:25
10291754010	**LAO-SS-A2-121514**	Water	12/15/14 11:15	12/16/14 10:25
10291754011	**LAO-SS-A3-121514**	Water	12/15/14 11:13	12/16/14 10:25

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10291754001	**LAO-SS-1-121114**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10291754002	**LAO-SS-1-121514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10291754003	**LAO-SS-2-121514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10291754004	**LAO-SS-1T-121514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10291754005	**LAO-SS-3-121514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10291754006	**LAO-SS-4-121514**	EPA 200.8	RJS	12	PASI-M
		EPA 245.1	DM	1	PASI-M
		SM 2320B	MW	4	PASI-M
		SM 2540C	DCL	1	PASI-M
		SM 2540D	DCL	1	PASI-M
		SM 4500-NO3 H	PH1	1	PASI-M
10291754007	**LAO-SS-SBC-01-121514**	SM 2320B	MW	4	PASI-M
10291754008	**LAO-SS-06F-121514**	SM 2320B	MW	4	PASI-M
10291754009	**LAO-SS-06G-121514**	SM 2320B	MW	4	PASI-M
10291754010	**LAO-SS-A2-121514**	SM 2320B	MW	4	PASI-M
10291754011	**LAO-SS-A3-121514**	SM 2320B	MW	4	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 29, 2014

General Information:
6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/51300

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10291754001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1866658)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1866659)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: December 29, 2014

Analyte Comments:

QC Batch: MPRP/51300

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1866658)
  - Calcium
- MSD (Lab ID: 1866659)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: December 29, 2014

General Information:
6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: BPAR-PIONEER-MT
Date: December 29, 2014

General Information:
10 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/39806

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10292260001,10292260002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1870542)
  - Alkalinity, Total as CaCO3
- MSD (Lab ID: 1870543)
  - Alkalinity, Total as CaCO3
- MSD (Lab ID: 1870545)
  - Alkalinity, Total as CaCO3

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: BPAR-PIONEER-MT
Date: December 29, 2014

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **SM 2540D**
Description: 2540D Total Suspended Solids
Client: BPAR-PIONEER-MT
Date: December 29, 2014

General Information:
5 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Method: **SM 4500-NO3 H**
Description: SM4500NO3-H, NO2 + NO3 pres.
Client: BPAR-PIONEER-MT
Date: December 29, 2014

General Information:
5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/21543

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10291754005,10291923001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1867829)
  - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1867831)
  - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1867830)
  - Nitrogen, NO2 plus NO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-1-121114 **Lab ID: 10291754001** Collected: 12/11/14 15:40 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0035J**	mg/L	0.010	0.0012	1	12/17/14 08:22	12/18/14 14:25	7429-90-5	
Arsenic	**0.0020**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 17:33	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	12/17/14 08:22	12/17/14 17:33	7440-43-9	
Calcium	**109**	mg/L	0.40	0.084	10	12/17/14 08:22	12/17/14 17:58	7440-70-2	M1
Copper	**0.0059**	mg/L	0.0010	0.00022	1	12/17/14 08:22	12/17/14 17:33	7440-50-8	
Iron	**0.010J**	mg/L	0.050	0.0080	1	12/17/14 08:22	12/17/14 17:33	7439-89-6	
Lead	**0.000084J**	mg/L	0.00010	0.000046	1	12/17/14 08:22	12/17/14 17:33	7439-92-1	
Magnesium	**34.1**	mg/L	0.10	0.028	10	12/17/14 08:22	12/17/14 17:58	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	12/17/14 08:22	12/17/14 17:33	7440-22-4	
Total Hardness by 2340B	**412**	mg/L	0.71	0.36	10	12/17/14 08:22	12/17/14 17:58		
Uranium-238	**0.0058**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 17:33	7440-61-1	
Zinc	**0.044**	mg/L	0.0050	0.0025	1	12/17/14 08:22	12/17/14 17:33	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/17/14 11:25	12/22/14 12:06	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-1-121514 **Lab ID: 10291754002** Collected: 12/15/14 11:05 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0058J**	mg/L	0.010	0.0012	1	12/17/14 08:22	12/18/14 13:51	7429-90-5	
Arsenic	**0.0018**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 18:22	7440-38-2	
Cadmium	**0.00013**	mg/L	0.000080	0.000033	1	12/17/14 08:22	12/17/14 18:22	7440-43-9	
Calcium	**101**	mg/L	0.40	0.084	10	12/17/14 08:22	12/17/14 18:27	7440-70-2	
Copper	**0.0077**	mg/L	0.0010	0.00022	1	12/17/14 08:22	12/17/14 18:22	7440-50-8	
Iron	**0.015J**	mg/L	0.050	0.0080	1	12/17/14 08:22	12/17/14 18:22	7439-89-6	
Lead	**0.00048**	mg/L	0.00010	0.000046	1	12/17/14 08:22	12/17/14 18:22	7439-92-1	
Magnesium	**31.8**	mg/L	0.10	0.028	10	12/17/14 08:22	12/17/14 18:27	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/17/14 08:22	12/17/14 18:22	7440-22-4	
Total Hardness by 2340B	**383**	mg/L	0.71	0.36	10	12/17/14 08:22	12/17/14 18:27		
Uranium-238	**0.0050**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 18:22	7440-61-1	
Zinc	**0.037**	mg/L	0.0050	0.0025	1	12/17/14 08:22	12/17/14 18:22	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/17/14 11:25	12/22/14 12:08	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 14:29		
Alkalinity, Total as CaCO3	**29.9**	mg/L	5.0	2.5	1		12/22/14 14:29		
Alkalinity,Bicarbonate (CaCO3)	**18.7**	mg/L	5.0	2.5	1		12/22/14 14:29		
Alkalinity,Carbonate (CaCO3)	**11.2**	mg/L	5.0	2.5	1		12/22/14 14:29		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**676**	mg/L	10.0	5.0	1		12/18/14 16:17		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		12/17/14 14:29		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.88**	mg/L	0.10	0.050	1		12/19/14 13:56		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-2-121514 **Lab ID: 10291754003** Collected: 12/15/14 11:30 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.16**	mg/L	0.010	0.0012	1	12/17/14 08:22	12/18/14 13:55	7429-90-5	
Arsenic	**0.016**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 14:33	7440-38-2	
Cadmium	**0.022**	mg/L	0.000080	0.000033	1	12/17/14 08:22	12/17/14 14:33	7440-43-9	
Calcium	**128**	mg/L	0.40	0.084	10	12/17/14 08:22	12/17/14 14:38	7440-70-2	
Copper	**0.67**	mg/L	0.010	0.0022	10	12/17/14 08:22	12/17/14 14:38	7440-50-8	
Iron	**3.3**	mg/L	0.050	0.0080	1	12/17/14 08:22	12/17/14 14:33	7439-89-6	
Lead	**0.0066**	mg/L	0.00010	0.000046	1	12/17/14 08:22	12/17/14 14:33	7439-92-1	
Magnesium	**35.1**	mg/L	0.10	0.028	10	12/17/14 08:22	12/17/14 14:38	7439-95-4	
Silver	**0.000077J**	mg/L	0.00050	0.000056	1	12/17/14 08:22	12/17/14 14:33	7440-22-4	
Total Hardness by 2340B	**465**	mg/L	0.71	0.36	10	12/17/14 08:22	12/17/14 14:38		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 14:33	7440-61-1	
Zinc	**6.3**	mg/L	0.25	0.12	50	12/17/14 08:22	12/17/14 14:43	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000029J**	mg/L	0.00020	0.000026	1	12/17/14 11:25	12/22/14 12:16	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 14:48		
Alkalinity, Total as CaCO3	**117**	mg/L	5.0	2.5	1		12/22/14 14:48		
Alkalinity,Bicarbonate (CaCO3)	**117**	mg/L	5.0	2.5	1		12/22/14 14:48		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 14:48		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**800**	mg/L	10.0	5.0	1		12/18/14 16:17		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**30.0**	mg/L	10.0	5.0	1		12/17/14 14:29		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**1.8**	mg/L	0.10	0.050	1		12/19/14 13:56		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-1T-121514 **Lab ID: 10291754004** Collected: 12/15/14 11:05 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0041J**	mg/L	0.010	0.0012	1	12/17/14 08:22	12/18/14 14:00	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 14:48	7440-38-2	
Cadmium	**0.000079J**	mg/L	0.000080	0.000033	1	12/17/14 08:22	12/17/14 14:48	7440-43-9	
Calcium	**101**	mg/L	0.40	0.084	10	12/17/14 08:22	12/17/14 14:53	7440-70-2	
Copper	**0.0053**	mg/L	0.0010	0.00022	1	12/17/14 08:22	12/17/14 14:48	7440-50-8	
Iron	**0.010J**	mg/L	0.050	0.0080	1	12/17/14 08:22	12/17/14 14:48	7439-89-6	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	12/17/14 08:22	12/17/14 14:48	7439-92-1	
Magnesium	**32.3**	mg/L	0.10	0.028	10	12/17/14 08:22	12/17/14 14:53	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/17/14 08:22	12/17/14 14:48	7440-22-4	
Total Hardness by 2340B	**385**	mg/L	0.71	0.36	10	12/17/14 08:22	12/17/14 14:53		
Uranium-238	**0.0049**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 14:48	7440-61-1	
Zinc	**0.031**	mg/L	0.0050	0.0025	1	12/17/14 08:22	12/17/14 14:48	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/17/14 11:25	12/22/14 12:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 14:53		
Alkalinity, Total as CaCO3	**34.3**	mg/L	5.0	2.5	1		12/22/14 14:53		
Alkalinity,Bicarbonate (CaCO3)	**18.8**	mg/L	5.0	2.5	1		12/22/14 14:53		
Alkalinity,Carbonate (CaCO3)	**15.5**	mg/L	5.0	2.5	1		12/22/14 14:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**715**	mg/L	10.0	5.0	1		12/18/14 16:17		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		12/17/14 14:29		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.88**	mg/L	0.10	0.050	1		12/19/14 13:57		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-3-121514 **Lab ID: 10291754005** Collected: 12/15/14 10:40 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.44**	mg/L	0.010	0.0012	1	12/17/14 08:22	12/18/14 14:05	7429-90-5	
Arsenic	**0.0046**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 18:32	7440-38-2	
Cadmium	**0.042**	mg/L	0.000080	0.000033	1	12/17/14 08:22	12/17/14 18:32	7440-43-9	
Calcium	**137**	mg/L	0.40	0.084	10	12/17/14 08:22	12/17/14 18:37	7440-70-2	
Copper	**2.6**	mg/L	0.010	0.0022	10	12/17/14 08:22	12/17/14 18:37	7440-50-8	
Iron	**12.5**	mg/L	0.050	0.0080	1	12/17/14 08:22	12/17/14 18:32	7439-89-6	
Lead	**0.0031**	mg/L	0.00010	0.000046	1	12/17/14 08:22	12/17/14 18:32	7439-92-1	
Magnesium	**37.3**	mg/L	0.10	0.028	10	12/17/14 08:22	12/17/14 18:37	7439-95-4	
Silver	**0.00012J**	mg/L	0.00050	0.000056	1	12/17/14 08:22	12/17/14 18:32	7440-22-4	
Total Hardness by 2340B	**497**	mg/L	0.71	0.36	10	12/17/14 08:22	12/17/14 18:37		
Uranium-238	**0.014**	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 18:32	7440-61-1	
Zinc	**8.4**	mg/L	0.25	0.12	50	12/17/14 08:22	12/17/14 18:41	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/17/14 11:25	12/22/14 12:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 14:56		
Alkalinity, Total as CaCO3	**68.8**	mg/L	5.0	2.5	1		12/22/14 14:56		
Alkalinity,Bicarbonate (CaCO3)	**68.8**	mg/L	5.0	2.5	1		12/22/14 14:56		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 14:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**876**	mg/L	10.0	5.0	1		12/22/14 15:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**31.0**	mg/L	10.0	5.0	1		12/17/14 14:29		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**2.4**	mg/L	0.10	0.050	1		12/19/14 13:57		M1

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-4-121514 **Lab ID: 10291754006** Collected: 12/15/14 12:00 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.030**	mg/L	0.010	0.0012	1	12/17/14 08:22	12/18/14 13:45	7429-90-5	
Arsenic	ND	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 17:28	7440-38-2	
Cadmium	ND	mg/L	0.000080	0.000033	1	12/17/14 08:22	12/17/14 17:28	7440-43-9	
Calcium	**0.014J**	mg/L	0.040	0.0084	1	12/17/14 08:22	12/17/14 17:28	7440-70-2	
Copper	**0.00040J**	mg/L	0.0010	0.00022	1	12/17/14 08:22	12/17/14 17:28	7440-50-8	
Iron	ND	mg/L	0.050	0.0080	1	12/17/14 08:22	12/17/14 17:28	7439-89-6	
Lead	**0.000057J**	mg/L	0.00010	0.000046	1	12/17/14 08:22	12/17/14 17:28	7439-92-1	
Magnesium	ND	mg/L	0.010	0.0028	1	12/17/14 08:22	12/17/14 17:28	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/17/14 08:22	12/17/14 17:28	7440-22-4	
Total Hardness by 2340B	**0.046J**	mg/L	0.071	0.036	1	12/17/14 08:22	12/17/14 17:28		
Uranium-238	ND	mg/L	0.00050	0.00025	1	12/17/14 08:22	12/17/14 17:28	7440-61-1	
Zinc	ND	mg/L	0.0050	0.0025	1	12/17/14 08:22	12/17/14 17:28	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/17/14 11:25	12/22/14 12:23	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:37		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	2.5	1		12/22/14 15:37		
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:37		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	5.0	1		12/22/14 15:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	10.0	5.0	1		12/17/14 14:29		
SM4500NO3-H, NO2 + NO3 pres.	Analytical Method: SM 4500-NO3 H								
Nitrogen, NO2 plus NO3	**0.053J**	mg/L	0.10	0.050	1		12/19/14 15:11		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-SBC-01-121514 **Lab ID: 10291754007** Collected: 12/15/14 11:10 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:01		
Alkalinity, Total as CaCO3	**102**	mg/L	5.0	2.5	1		12/22/14 15:01		
Alkalinity,Bicarbonate (CaCO3)	**102**	mg/L	5.0	2.5	1		12/22/14 15:01		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:01		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-06F-121514 **Lab ID: 10291754008** Collected: 12/15/14 10:55 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:04		
Alkalinity, Total as CaCO3	**91.0**	mg/L	5.0	2.5	1		12/22/14 15:04		
Alkalinity,Bicarbonate (CaCO3)	**91.0**	mg/L	5.0	2.5	1		12/22/14 15:04		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:04		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-06G-121514 **Lab ID: 10291754009** Collected: 12/15/14 10:50 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:08		
Alkalinity, Total as CaCO3	**94.0**	mg/L	5.0	2.5	1		12/22/14 15:08		
Alkalinity,Bicarbonate (CaCO3)	**94.0**	mg/L	5.0	2.5	1		12/22/14 15:08		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/22/14 15:08		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-A2-121514 **Lab ID: 10291754010** Collected: 12/15/14 11:15 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/23/14 11:54		
Alkalinity, Total as CaCO3	**35.4**	mg/L	5.0	2.5	1		12/23/14 11:54		
Alkalinity,Bicarbonate (CaCO3)	**14.1**	mg/L	5.0	2.5	1		12/23/14 11:54		
Alkalinity,Carbonate (CaCO3)	**21.3**	mg/L	5.0	2.5	1		12/23/14 11:54		

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Sample: LAO-SS-A3-121514 **Lab ID: 10291754011** Collected: 12/15/14 11:13 Received: 12/16/14 10:25 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Hydroxide (CaCO3)	ND	mg/L	5.0	2.5	1		12/23/14 12:08		
Alkalinity, Total as CaCO3	**36.2**	mg/L	5.0	2.5	1		12/23/14 12:08		
Alkalinity,Bicarbonate (CaCO3)	**36.2**	mg/L	5.0	2.5	1		12/23/14 12:08		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	2.5	1		12/23/14 12:08		

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: MERP/12378 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10291754001, 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

METHOD BLANK: 1866687 Matrix: Water
Associated Lab Samples: 10291754001, 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	12/22/14 12:01	

LABORATORY CONTROL SAMPLE: 1866688

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0043	86	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1866689 1866690

Parameter	Units	10291754002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0051	0.0050	102	101	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: MPRP/51300 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10291754001, 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

METHOD BLANK: 1866656 Matrix: Water
Associated Lab Samples: 10291754001, 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	12/18/14 13:41	
Arsenic	mg/L	ND	0.00050	12/17/14 14:24	
Cadmium	mg/L	ND	0.000080	12/17/14 14:24	
Calcium	mg/L	ND	0.040	12/17/14 14:24	
Copper	mg/L	ND	0.0010	12/17/14 14:24	
Iron	mg/L	ND	0.050	12/17/14 14:24	
Lead	mg/L	ND	0.00010	12/17/14 14:24	
Magnesium	mg/L	ND	0.010	12/17/14 14:24	
Silver	mg/L	ND	0.00050	12/17/14 14:24	
Uranium-238	mg/L	ND	0.00050	12/17/14 14:24	
Zinc	mg/L	ND	0.0050	12/17/14 14:24	

LABORATORY CONTROL SAMPLE: 1866657

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.076	95	85-115	
Arsenic	mg/L	.08	0.080	100	85-115	
Cadmium	mg/L	.08	0.079	98	85-115	
Calcium	mg/L	1	1.0	102	85-115	
Copper	mg/L	.08	0.079	99	85-115	
Iron	mg/L	1	0.95	95	85-115	
Lead	mg/L	.08	0.077	96	85-115	
Magnesium	mg/L	1	0.98	98	85-115	
Silver	mg/L	.08	0.077	96	85-115	
Uranium-238	mg/L	.08	0.077	97	85-115	
Zinc	mg/L	.08	0.080	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1866658 1866659

Parameter	Units	10291754001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0035J	.08	.08	0.088	0.091	105	109	70-130	4	20	
Arsenic	mg/L	0.0020	.08	.08	0.084	0.084	103	102	70-130	1	20	
Cadmium	mg/L	0.00016	.08	.08	0.078	0.078	98	97	70-130	1	20	
Calcium	mg/L	109	1	1	109	107	50	-188	70-130	2	20	E,M1
Copper	mg/L	0.0059	.08	.08	0.083	0.081	96	94	70-130	2	20	
Iron	mg/L	0.010J	1	1	0.96	0.94	95	93	70-130	2	20	
Lead	mg/L	0.000084J	.08	.08	0.076	0.074	95	93	70-130	3	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1866658 1866659

Parameter	Units	10291754001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	34.1	1	1	34.4	33.7	32	-38	70-130	2	20	M1
Silver	mg/L	ND	.08	.08	0.074	0.073	93	91	70-130	2	20	
Uranium-238	mg/L	0.0058	.08	.08	0.083	0.081	97	94	70-130	3	20	
Zinc	mg/L	0.044	.08	.08	0.12	0.12	101	99	70-130	2	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: WET/39806 — Analysis Method: SM 2320B
QC Batch Method: SM 2320B — Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10291754002, 10291754003, 10291754004, 10291754005, 10291754006, 10291754007, 10291754008, 10291754009

METHOD BLANK: 1870539 — Matrix: Water
Associated Lab Samples: 10291754002, 10291754003, 10291754004, 10291754005, 10291754006, 10291754007, 10291754008, 10291754009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Hydroxide (CaCO3)	mg/L	ND	5.0	12/22/14 12:57	
Alkalinity, Total as CaCO3	mg/L	ND	5.0	12/22/14 12:57	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	12/22/14 12:57	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	12/22/14 12:57	

LABORATORY CONTROL SAMPLE & LCSD: 1870540 1870541

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	42.9	43.0	107	108	90-110	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1870542 1870543

Parameter	Units	10292260001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	215	40	40	230	234	36	47	80-120	2	30	H3,M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1870544 1870545

Parameter	Units	10292260002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	175	40	40	210	205	89	76	80-120	3	30	H3,M1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: WET/39828 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10291754010, 10291754011

METHOD BLANK: 1871877 | Matrix: Water
Associated Lab Samples: 10291754010, 10291754011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Hydroxide (CaCO3)	mg/L	ND	5.0	12/23/14 10:05	
Alkalinity, Total as CaCO3	mg/L	ND	5.0	12/23/14 10:05	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	12/23/14 10:05	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	12/23/14 10:05	

LABORATORY CONTROL SAMPLE & LCSD: 1871878 1871879

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.0	43.1	107	108	90-110	0	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1871880 1871881

Parameter	Units	10291754010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	35.4	40	40	74.6	75.2	98	99	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1871882 1871883

Parameter	Units	10291754011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	36.2	40	40	77.6	77.3	104	103	80-120	0	30	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: WET/39763 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10291754002, 10291754003, 10291754004

METHOD BLANK: 1868048 | Matrix: Water
Associated Lab Samples: 10291754002, 10291754003, 10291754004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	12/18/14 16:17	

LABORATORY CONTROL SAMPLE: 1868049

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 1868050

Parameter	Units	10291954001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	207	228	10	10	H1

SAMPLE DUPLICATE: 1868051

Parameter	Units	10291954003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3170	3090	2	10	H1

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: WET/39807 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 10291754005, 10291754006

METHOD BLANK: 1870627 | Matrix: Water
Associated Lab Samples: 10291754005, 10291754006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	12/22/14 15:00	

LABORATORY CONTROL SAMPLE: 1870628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1100	110	80-120	

SAMPLE DUPLICATE: 1870629

Parameter	Units	10292195001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	32800	31600	4	10	H1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: WET/39739 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

METHOD BLANK: 1866796 Matrix: Water
Associated Lab Samples: 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	10.0	12/17/14 14:29	

LABORATORY CONTROL SAMPLE: 1866797

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	114	114	80-120	

SAMPLE DUPLICATE: 1866798

Parameter	Units	10291689004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 1866799

Parameter	Units	10291689005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

QC Batch: WETA/21543 | Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H | Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

METHOD BLANK: 1867827 | Matrix: Water
Associated Lab Samples: 10291754002, 10291754003, 10291754004, 10291754005, 10291754006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	12/19/14 13:29	

LABORATORY CONTROL SAMPLE: 1867828

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1867829 1867830

Parameter	Units	10291923001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	1.0	2.5	2.5	1.4	1.4	16	16	80-120	0	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1867831 1867832

Parameter	Units	10291754005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	2.4	2.5	2.5	4.2	4.5	75	84	80-120	6	30	M1

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10291754

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10291754001	**LAO-SS-1-121114**	EPA 200.8	MPRP/51300	EPA 200.8	ICPM/22798
10291754002	**LAO-SS-1-121514**	EPA 200.8	MPRP/51300	EPA 200.8	ICPM/22798
10291754003	**LAO-SS-2-121514**	EPA 200.8	MPRP/51300	EPA 200.8	ICPM/22798
10291754004	**LAO-SS-1T-121514**	EPA 200.8	MPRP/51300	EPA 200.8	ICPM/22798
10291754005	**LAO-SS-3-121514**	EPA 200.8	MPRP/51300	EPA 200.8	ICPM/22798
10291754006	**LAO-SS-4-121514**	EPA 200.8	MPRP/51300	EPA 200.8	ICPM/22798
10291754001	**LAO-SS-1-121114**	EPA 245.1	MERP/12378	EPA 245.1	MERC/14333
10291754002	**LAO-SS-1-121514**	EPA 245.1	MERP/12378	EPA 245.1	MERC/14333
10291754003	**LAO-SS-2-121514**	EPA 245.1	MERP/12378	EPA 245.1	MERC/14333
10291754004	**LAO-SS-1T-121514**	EPA 245.1	MERP/12378	EPA 245.1	MERC/14333
10291754005	**LAO-SS-3-121514**	EPA 245.1	MERP/12378	EPA 245.1	MERC/14333
10291754006	**LAO-SS-4-121514**	EPA 245.1	MERP/12378	EPA 245.1	MERC/14333
10291754002	**LAO-SS-1-121514**	SM 2320B	WET/39806		
10291754003	**LAO-SS-2-121514**	SM 2320B	WET/39806		
10291754004	**LAO-SS-1T-121514**	SM 2320B	WET/39806		
10291754005	**LAO-SS-3-121514**	SM 2320B	WET/39806		
10291754006	**LAO-SS-4-121514**	SM 2320B	WET/39806		
10291754007	**LAO-SS-SBC-01-121514**	SM 2320B	WET/39806		
10291754008	**LAO-SS-06F-121514**	SM 2320B	WET/39806		
10291754009	**LAO-SS-06G-121514**	SM 2320B	WET/39806		
10291754010	**LAO-SS-A2-121514**	SM 2320B	WET/39828		
10291754011	**LAO-SS-A3-121514**	SM 2320B	WET/39828		
10291754002	**LAO-SS-1-121514**	SM 2540C	WET/39763		
10291754003	**LAO-SS-2-121514**	SM 2540C	WET/39763		
10291754004	**LAO-SS-1T-121514**	SM 2540C	WET/39763		
10291754005	**LAO-SS-3-121514**	SM 2540C	WET/39807		
10291754006	**LAO-SS-4-121514**	SM 2540C	WET/39807		
10291754002	**LAO-SS-1-121514**	SM 2540D	WET/39739		
10291754003	**LAO-SS-2-121514**	SM 2540D	WET/39739		
10291754004	**LAO-SS-1T-121514**	SM 2540D	WET/39739		
10291754005	**LAO-SS-3-121514**	SM 2540D	WET/39739		
10291754006	**LAO-SS-4-121514**	SM 2540D	WET/39739		
10291754002	**LAO-SS-1-121514**	SM 4500-NO3 H	WETA/21543		
10291754003	**LAO-SS-2-121514**	SM 4500-NO3 H	WETA/21543		
10291754004	**LAO-SS-1T-121514**	SM 4500-NO3 H	WETA/21543		
10291754005	**LAO-SS-3-121514**	SM 4500-NO3 H	WETA/21543		
10291754006	**LAO-SS-4-121514**	SM 4500-NO3 H	WETA/21543		

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bp rm

Laboratory Management Program LaMP Chain of Custody Record

SHORT HOLD 12/16/14 BJ

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils | Req Due Date (mm/dd/yy): | Rush TAT: Yes ___ No x

BP Facility No: LAO Wetlands (Weekly) | Lab Work Order Number: 10291754

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	6301/2 W Broadway, Butte MT 59701
Lab Phone:	612-607-6363 612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ___ OOC-BU ___ OOC-RM ___	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ___

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ___

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)	TDS/TSS/Alkalinity	Nitrate/Nitrite					Comments
	LAO-SS-1-121114	12/11/14	1540		X			2			2				X			X	X							001
	LAO-SS-1-121514	12/15/14	1105		X			4	X	X	2				X			X	X	X						002
	LAO-SS-2-121514	12/15/14	1130		X			3	X	X	1				X				X	X						003
	LAO-SS-IT-121514	12/15/14	1105		X			3	X	X	X				X				X	X						004
	LAO-SS-3-121514	12/15/14	1040		X			3	X	X	X				X				X	X						005
	LAO-SS-4-121514	12/15/14	12:00		X			3	X	X	X				X				X	X						006

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: T. Hrelev						
Sampler's Company: Pioneer Technical Services	PTS	12/15/14	1300	Pace	12/16/14	1025
Shipment Method: Fed Ex Ship Date: 12/15/14						
Shipment Tracking No: 8057 0739225						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: BP_USA_MT_SilverBow_Butte Priority Sites Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No ____

BP Facility No: ~~Warm Springs Pond~~ LAO WETLANDS Lab Work Order Number: _____

Lab Name:	Pace Analytical Services	Facility Address:	820 Centennial	Consultant/Contractor:	Pioneer Technical Services
Lab Address:	1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Butte, MT 59701	Consultant/Contractor Project No:	
Lab PM:	Julie Thieschafer	Lead Regulatory Agency:	MTDEQ	Address:	63 1/2 West Broadway Butte, MT 59701
Lab Phone:	Office: 612-607-6363 Cell :612-437-2613	California Global ID No.:		Consultant/Contractor PM:	Dave Griffis
Lab Shipping Accnt:		Enfos Proposal No:		Phone: 406-563-9371	Email: dgriffis@pioneer-technical.com
Lab Bottle Order No:		Accounting Mode:	Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To:	and to lab.enfosdoc@bp.com
Other Info:		Stage:	Activity:	Invoice To:	BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone:

BP PM Email: shannon.dunlap@bp.com

Report Type & QC Level: Standard x ; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Metals by 200.8	Dissolved Metals by 200.8	TKN, NH3, T. Phos	Ortho Phos	Alkalinity, Turbidity, TSS, TVS	TDS	Sulfate	Nitrate + Nitrite	Chloride	DOC	Comments
	LAO-SS-SBG01-121514	12/15/14	1110		x			1	x										x	x					007
	LAO-SS-06F-121514	12/15/14	1055		x			1	x										x	x					008
	LAO-SS-06G-121514	12/15/14	1050		x			1	x										x	x					009
	LAO-SS-A2-121514	12/15/14	1115		x			1	x										x	x					010
	LAO-SS-A3-121514	12/15/14	11:13		x			1	x										x	x					011

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: T. Hicks						
Sampler's Company: ~~Fed Ex~~ Pioneer Technical Services	PTS	12/15/14	1300	B. Stay Pace	12/15/14	1025
Shipment Method: Fed Ex Ship Date: 12/15/14						
Shipment Tracking No: 8057 6073 9225						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 0.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Pioneer

Project #: WO#: 10291754

10291754

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 8057 6073 9225

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A9130516413 ☐ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.5 **Cooler Temp Corrected (°C):** 0.5 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** 0.0 **Date and Initials of Person Examining Contents:** 12/15/14 BD

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☑ Yes	☐ No	☐ N/A	6. TSS, TDS
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☐ Yes	☐ No	☑ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. 2,1,3,6 2,4 ☐ HNO_3 ☑ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 0-06
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1200	Temp: 0.5	Corrected Temp: 0.5
Time: 1218	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: **Date:** 12/16/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 07, 2015

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands
Pace Project No.: 10292874

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on December 24, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands
Pace Project No.: 10292874

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: LAO Wetlands
Pace Project No.: 10292874

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10292874001	**LAO-SS-1-121814**	Water	12/18/14 10:30	12/24/14 11:40
10292874002	**LAO-SS-1-122214**	Water	12/22/14 12:15	12/24/14 11:40
10292874003	**LAO-SS-2-122214**	Water	12/22/14 12:45	12/24/14 11:40

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands
Pace Project No.: 10292874

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10292874001	**LAO-SS-1-121814**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10292874002	**LAO-SS-1-122214**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10292874003	**LAO-SS-2-122214**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10292874

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 07, 2015

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/51567

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10292874001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1875107)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1875108)
  - Calcium
  - Magnesium

Additional Comments:

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10292874

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 07, 2015

Analyte Comments:

QC Batch: MPRP/51567

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1875107)
  - Calcium
- MSD (Lab ID: 1875108)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands
Pace Project No.: 10292874

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 07, 2015

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10292874

Sample: LAO-SS-1-121814 **Lab ID: 10292874001** Collected: 12/18/14 10:30 Received: 12/24/14 11:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0015J**	mg/L	0.010	0.0012	1	12/30/14 10:05	01/02/15 14:03	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.00025	1	12/30/14 10:05	01/02/15 14:03	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	12/30/14 10:05	01/02/15 14:03	7440-43-9	
Calcium	**113**	mg/L	0.80	0.17	20	12/30/14 10:05	01/02/15 14:12	7440-70-2	M1
Copper	**0.0058**	mg/L	0.0010	0.00022	1	12/30/14 10:05	01/02/15 14:03	7440-50-8	
Iron	**0.020J**	mg/L	0.050	0.0080	1	12/30/14 10:05	01/02/15 14:03	7439-89-6	
Lead	**0.00012**	mg/L	0.00010	0.000046	1	12/30/14 10:05	01/02/15 14:03	7439-92-1	
Magnesium	**34.0**	mg/L	0.20	0.057	20	12/30/14 10:05	01/02/15 14:12	7439-95-4	M1
Silver	**0.00016J**	mg/L	0.00050	0.000056	1	12/30/14 10:05	01/02/15 14:03	7440-22-4	
Total Hardness by 2340B	**422**	mg/L	1.4	0.71	20	12/30/14 10:05	01/02/15 14:12		
Uranium-238	**0.0049**	mg/L	0.00050	0.00025	1	12/30/14 10:05	01/02/15 14:03	7440-61-1	
Zinc	**0.038**	mg/L	0.0050	0.0025	1	12/30/14 10:05	01/02/15 14:03	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/30/14 11:08	12/30/14 15:09	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10292874

Sample: LAO-SS-1-122214 **Lab ID: 10292874002** Collected: 12/22/14 12:15 Received: 12/24/14 11:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.029**	mg/L	0.010	0.0012	1	12/30/14 10:05	01/02/15 14:20	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.00025	1	12/30/14 10:05	01/02/15 14:20	7440-38-2	
Cadmium	**0.00016**	mg/L	0.000080	0.000033	1	12/30/14 10:05	01/02/15 14:20	7440-43-9	
Calcium	**119**	mg/L	0.80	0.17	20	12/30/14 10:05	01/02/15 14:23	7440-70-2	
Copper	**0.0057**	mg/L	0.0010	0.00022	1	12/30/14 10:05	01/02/15 14:20	7440-50-8	
Iron	**0.013J**	mg/L	0.050	0.0080	1	12/30/14 10:05	01/02/15 14:20	7439-89-6	
Lead	**0.00013**	mg/L	0.00010	0.000046	1	12/30/14 10:05	01/02/15 14:20	7439-92-1	
Magnesium	**35.6**	mg/L	0.20	0.057	20	12/30/14 10:05	01/02/15 14:23	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/30/14 10:05	01/02/15 14:20	7440-22-4	
Total Hardness by 2340B	**444**	mg/L	1.4	0.71	20	12/30/14 10:05	01/02/15 14:23		
Uranium-238	**0.0053**	mg/L	0.00050	0.00025	1	12/30/14 10:05	01/02/15 14:20	7440-61-1	
Zinc	**0.040**	mg/L	0.0050	0.0025	1	12/30/14 10:05	01/02/15 14:20	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/30/14 11:08	12/30/14 15:12	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands
Pace Project No.: 10292874

Sample: LAO-SS-2-122214 **Lab ID: 10292874003** Collected: 12/22/14 12:45 Received: 12/24/14 11:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.15**	mg/L	0.010	0.0012	1	12/30/14 10:05	01/02/15 14:32	7429-90-5	
Arsenic	**0.017**	mg/L	0.00050	0.00025	1	12/30/14 10:05	01/02/15 14:32	7440-38-2	
Cadmium	**0.023**	mg/L	0.000080	0.000033	1	12/30/14 10:05	01/02/15 14:32	7440-43-9	
Calcium	**144**	mg/L	0.80	0.17	20	12/30/14 10:05	01/02/15 14:34	7440-70-2	
Copper	**0.62**	mg/L	0.020	0.0043	20	12/30/14 10:05	01/02/15 14:34	7440-50-8	
Iron	**3.2**	mg/L	0.050	0.0080	1	12/30/14 10:05	01/02/15 14:32	7439-89-6	
Lead	**0.0069**	mg/L	0.00010	0.000046	1	12/30/14 10:05	01/02/15 14:32	7439-92-1	
Magnesium	**41.2**	mg/L	0.20	0.057	20	12/30/14 10:05	01/02/15 14:34	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	12/30/14 10:05	01/02/15 14:32	7440-22-4	
Total Hardness by 2340B	**529**	mg/L	1.4	0.71	20	12/30/14 10:05	01/02/15 14:34		
Uranium-238	**0.015**	mg/L	0.00050	0.00025	1	12/30/14 10:05	01/02/15 14:32	7440-61-1	
Zinc	**6.2**	mg/L	0.10	0.050	20	12/30/14 10:05	01/02/15 14:34	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/30/14 11:08	12/30/14 15:14	7439-97-6	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10292874

QC Batch: MERP/12465 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10292874001, 10292874002, 10292874003

METHOD BLANK: 1875109 Matrix: Water
Associated Lab Samples: 10292874001, 10292874002, 10292874003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	12/30/14 15:04	

LABORATORY CONTROL SAMPLE: 1875110

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0049	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1875111 1875112

Parameter	Units	10292874003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0048	0.0048	97	97	70-130	0	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10292874

QC Batch: MPRP/51567 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10292874001, 10292874002, 10292874003

METHOD BLANK: 1875105 Matrix: Water
Associated Lab Samples: 10292874001, 10292874002, 10292874003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	01/02/15 13:58	
Arsenic	mg/L	ND	0.00050	01/02/15 13:58	
Cadmium	mg/L	ND	0.000080	01/02/15 13:58	
Calcium	mg/L	ND	0.040	01/02/15 13:58	
Copper	mg/L	ND	0.0010	01/02/15 13:58	
Iron	mg/L	ND	0.050	01/02/15 13:58	
Lead	mg/L	ND	0.00010	01/02/15 13:58	
Magnesium	mg/L	ND	0.010	01/02/15 13:58	
Silver	mg/L	ND	0.00050	01/02/15 13:58	
Uranium-238	mg/L	ND	0.00050	01/02/15 13:58	
Zinc	mg/L	ND	0.0050	01/02/15 13:58	

LABORATORY CONTROL SAMPLE: 1875106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.084	105	85-115	
Arsenic	mg/L	.08	0.083	104	85-115	
Cadmium	mg/L	.08	0.085	106	85-115	
Calcium	mg/L	1	0.97	97	85-115	
Copper	mg/L	.08	0.089	111	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.083	104	85-115	
Magnesium	mg/L	1	1.1	106	85-115	
Silver	mg/L	.08	0.085	106	85-115	
Uranium-238	mg/L	.08	0.083	103	85-115	
Zinc	mg/L	.08	0.084	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1875107 1875108

Parameter	Units	10292874001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0015J	.08	.08	0.082	0.085	101	104	70-130	3	20	
Arsenic	mg/L	0.0017	.08	.08	0.084	0.087	103	106	70-130	3	20	
Cadmium	mg/L	0.00016	.08	.08	0.083	0.085	103	106	70-130	2	20	
Calcium	mg/L	113	1	1	115	121	235	786	70-130	5	20	E,M1
Copper	mg/L	0.0058	.08	.08	0.092	0.095	108	111	70-130	2	20	
Iron	mg/L	0.020J	1	1	1.1	1.1	107	111	70-130	4	20	
Lead	mg/L	0.00012	.08	.08	0.084	0.086	105	107	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands
Pace Project No.: 10292874

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1875107 1875108

Parameter	Units	10292874001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	34.0	1	1	36.0	37.6	192	352	70-130	4	20	M1
Silver	mg/L	0.00016J	.08	.08	0.080	0.083	100	104	70-130	4	20	
Uranium-238	mg/L	0.0049	.08	.08	0.086	0.089	102	105	70-130	3	20	
Zinc	mg/L	0.038	.08	.08	0.13	0.13	110	115	70-130	3	20	

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QUALIFIERS

Project: LAO Wetlands
Pace Project No.: 10292874

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands
Pace Project No.: 10292874

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10292874001	**LAO-SS-1-121814**	EPA 200.8	MPRP/51567	EPA 200.8	ICPM/22895
10292874002	**LAO-SS-1-122214**	EPA 200.8	MPRP/51567	EPA 200.8	ICPM/22895
10292874003	**LAO-SS-2-122214**	EPA 200.8	MPRP/51567	EPA 200.8	ICPM/22895
10292874001	**LAO-SS-1-121814**	EPA 245.1	MERP/12465	EPA 245.1	MERC/14428
10292874002	**LAO-SS-1-122214**	EPA 245.1	MERP/12465	EPA 245.1	MERC/14428
10292874003	**LAO-SS-2-122214**	EPA 245.1	MERP/12465	EPA 245.1	MERC/14428

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Laboratory Management Program LaMP Chain of Custody Record

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 1029247-4

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8	(Al, Ca, Mg, As, cd, Cu, Fe,	Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments
	LAO-SS-1 - 121814	12/18/14	10:30		X						2				X			X							001
	LAO-SS-1 - 122214	12/22/14	12:15		X						2				X			X							002
	LAO-SS-2 - 122214	12/22/14	12:45		X						1				X										003

Sampler's Name: T. Hrelay	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	[signature] / PTS	12/22/14	1500	[signature] Pace	12/24/14	1140
Shipment Method: FedEx Ship Date: 12/22/14						
Shipment Tracking No: 8057 6073 9258						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.2 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP-PioneerTech

Project #: WO#: 10292874

10292874

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] SpeeDee [ ] Other:

Tracking Number: 8057 6073 9258

Custody Seal on Cooler/Box Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Optional: Proj. Due Date: Proj. Name:

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [X] None [ ] Other: **Temp Blank?** [X] Yes [ ] No

Thermom. Used: [X] B88A9130516413 [ ] B88A912167504 [ ] B88A9132521491 **Type of Ice:** [X] Wet [ ] Blue [ ] None [ ] Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.2 **Cooler Temp Corrected (°C):** 4.2 **Biological Tissue Frozen?** [ ] Yes [ ] No [X] NA

Temp should be above freezing to 6°C **Correction Factor:** true **Date and Initials of Person Examining Contents:** EMC 12/24/14

				Comments:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Chain of Custody Filled Out?	[X] Yes	[ ] No	[ ] N/A	2.
Chain of Custody Relinquished?	[X] Yes	[ ] No	[ ] N/A	3.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	4.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	5.
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[X] No	[ ] N/A	6.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	[ ] Yes	[ ] No	[X] N/A	8.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	9.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	10.
Filtered Volume Received for Dissolved Tests?	[X] Yes	[ ] No	[ ] N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	[X] Yes	[ ] No	[ ] N/A	12.
All containers needing acid/base preservation have been checked?	[X] Yes	[ ] No	[ ] N/A	13. 3 1/1 [X] HNO_3 2/2 [ ] H_2SO_4 [ ] NaOH [ ] HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	[X] Yes	[ ] No	[ ] N/A	Sample # 1-2
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	[ ] Yes	[ ] No	[X] N/A	14.
3 Trip Blanks Present?	[ ] Yes	[ ] No	[X] N/A	15.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins	
Opened Time: 12:35 Temp: 4.2	Corrected Temp:
Time: 12:41 put in cooler	
Time: Temp:	Corrected Temp:

Project Manager Review: [signature] **Date:** 12/26/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

January 13, 2015

Dave Griffis
Pioneer Technical
1101 S. Montana Street
Butte, MT 59701

RE: Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Dear Dave Griffis:
Enclosed are the analytical results for sample(s) received by the laboratory on December 30, 2014. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 10.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chee Lee
chee.lee@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10293057001	**LAO-SS-1-122514**	Water	12/25/14 13:30	12/30/14 10:10
10293057002	**LAO-SS-1-122914**	Water	12/29/14 11:30	12/30/14 10:10
10293057003	**LAO-SS-2-122914**	Water	12/29/14 12:00	12/30/14 10:10

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SAMPLE ANALYTE COUNT

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10293057001	**LAO-SS-1-122514**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10293057002	**LAO-SS-1-122914**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M
10293057003	**LAO-SS-2-122914**	EPA 200.8	TT3	12	PASI-M
		EPA 245.1	DM	1	PASI-M

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 13, 2015

General Information:
3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/51703

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10293057002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1878845)
  - Calcium
  - Magnesium
- MSD (Lab ID: 1878846)
  - Calcium

Additional Comments:

Analyte Comments:

QC Batch: MPRP/51703

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1878845)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: BPAR-PIONEER-MT
Date: January 13, 2015

Analyte Comments:

QC Batch: MPRP/51703

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MSD (Lab ID: 1878846)
  - Calcium

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PROJECT NARRATIVE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Method: **EPA 245.1**
Description: 245.1 Mercury
Client: BPAR-PIONEER-MT
Date: January 13, 2015

General Information:
3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: MERP/12470

B: Analyte was detected in the associated method blank.

- BLANK for HBN 335534 [MERP/124 (Lab ID: 1875575)
  - Mercury

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Sample: LAO-SS-1-122514 **Lab ID: 10293057001** Collected: 12/25/14 13:30 Received: 12/30/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0053J**	mg/L	0.010	0.0012	1	01/09/15 11:04	01/09/15 13:45	7429-90-5	
Arsenic	**0.0016**	mg/L	0.00050	0.00025	1	01/09/15 11:04	01/09/15 13:45	7440-38-2	
Cadmium	**0.00015**	mg/L	0.000080	0.000033	1	01/09/15 11:04	01/09/15 13:45	7440-43-9	
Calcium	**109**	mg/L	0.80	0.17	20	01/09/15 11:04	01/09/15 13:48	7440-70-2	
Copper	**0.0051**	mg/L	0.0010	0.00022	1	01/09/15 11:04	01/09/15 13:45	7440-50-8	
Iron	**0.027J**	mg/L	0.050	0.0080	1	01/09/15 11:04	01/09/15 13:45	7439-89-6	
Lead	**0.00016**	mg/L	0.00010	0.000046	1	01/09/15 11:04	01/09/15 13:45	7439-92-1	
Magnesium	**33.4**	mg/L	0.20	0.057	20	01/09/15 11:04	01/09/15 13:48	7439-95-4	
Silver	ND	mg/L	0.00050	0.000056	1	01/09/15 11:04	01/09/15 13:45	7440-22-4	
Total Hardness by 2340B	**411**	mg/L	1.4	0.71	20	01/09/15 11:04	01/09/15 13:48		
Uranium-238	**0.0054**	mg/L	0.00050	0.00025	1	01/09/15 11:04	01/09/15 13:45	7440-61-1	
Zinc	**0.037**	mg/L	0.0050	0.0025	1	01/09/15 11:04	01/09/15 13:45	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/31/14 11:10	01/06/15 15:03	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Sample: LAO-SS-1-122914 **Lab ID: 10293057002** Collected: 12/29/14 11:30 Received: 12/30/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.0049J**	mg/L	0.010	0.0012	1	01/09/15 11:04	01/09/15 13:51	7429-90-5	
Arsenic	**0.0017**	mg/L	0.00050	0.00025	1	01/09/15 11:04	01/09/15 13:51	7440-38-2	
Cadmium	**0.00018**	mg/L	0.000080	0.000033	1	01/09/15 11:04	01/09/15 13:51	7440-43-9	
Calcium	**111**	mg/L	0.80	0.17	20	01/09/15 11:04	01/09/15 13:59	7440-70-2	M1
Copper	**0.0068**	mg/L	0.0010	0.00022	1	01/09/15 11:04	01/09/15 13:51	7440-50-8	
Iron	**0.014J**	mg/L	0.050	0.0080	1	01/09/15 11:04	01/09/15 13:51	7439-89-6	
Lead	**0.00011**	mg/L	0.00010	0.000046	1	01/09/15 11:04	01/09/15 13:51	7439-92-1	
Magnesium	**35.8**	mg/L	0.20	0.057	20	01/09/15 11:04	01/09/15 13:59	7439-95-4	M1
Silver	ND	mg/L	0.00050	0.000056	1	01/09/15 11:04	01/13/15 07:50	7440-22-4	
Total Hardness by 2340B	**426**	mg/L	1.4	0.71	20	01/09/15 11:04	01/09/15 13:59		
Uranium-238	**0.0051**	mg/L	0.00050	0.00025	1	01/09/15 11:04	01/09/15 13:51	7440-61-1	
Zinc	**0.047**	mg/L	0.0050	0.0025	1	01/09/15 11:04	01/09/15 13:51	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	ND	mg/L	0.00020	0.000026	1	12/31/14 11:10	01/06/15 15:10	7439-97-6	

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ANALYTICAL RESULTS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Sample: LAO-SS-2-122914 **Lab ID: 10293057003** Collected: 12/29/14 12:00 Received: 12/30/14 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum	**0.20**	mg/L	0.010	0.0012	1	01/09/15 11:04	01/09/15 14:22	7429-90-5	
Arsenic	**0.022**	mg/L	0.00050	0.00025	1	01/09/15 11:04	01/09/15 14:22	7440-38-2	
Cadmium	**0.022**	mg/L	0.000080	0.000033	1	01/09/15 11:04	01/09/15 14:22	7440-43-9	
Calcium	**130**	mg/L	0.80	0.17	20	01/09/15 11:04	01/09/15 14:25	7440-70-2	
Copper	**0.83**	mg/L	0.020	0.0043	20	01/09/15 11:04	01/09/15 14:25	7440-50-8	
Iron	**4.7**	mg/L	0.050	0.0080	1	01/09/15 11:04	01/09/15 14:22	7439-89-6	
Lead	**0.010**	mg/L	0.00010	0.000046	1	01/09/15 11:04	01/09/15 14:22	7439-92-1	
Magnesium	**36.1**	mg/L	0.20	0.057	20	01/09/15 11:04	01/09/15 14:25	7439-95-4	
Silver	**0.00015J**	mg/L	0.00050	0.000056	1	01/09/15 11:04	01/09/15 14:22	7440-22-4	
Total Hardness by 2340B	**473**	mg/L	1.4	0.71	20	01/09/15 11:04	01/09/15 14:25		
Uranium-238	**0.016**	mg/L	0.00050	0.00025	1	01/09/15 11:04	01/09/15 14:22	7440-61-1	
Zinc	**6.1**	mg/L	0.10	0.050	20	01/09/15 11:04	01/09/15 14:25	7440-66-6	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1								
Mercury	**0.000050J**	mg/L	0.00020	0.000026	1	12/31/14 11:10	01/06/15 15:13	7439-97-6	B

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

QC Batch: MERP/12470 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 10293057001, 10293057002, 10293057003

METHOD BLANK: 1875575 Matrix: Water
Associated Lab Samples: 10293057001, 10293057002, 10293057003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000028J	0.00020	01/06/15 14:58	

LABORATORY CONTROL SAMPLE: 1875576

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0048	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1875577 1875578

Parameter	Units	10293057001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	.005	.005	0.0048	0.0048	94	94	70-130	0	20	

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

QC Batch: MPRP/51703 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10293057001, 10293057002, 10293057003

METHOD BLANK: 1878532 Matrix: Water
Associated Lab Samples: 10293057001, 10293057002, 10293057003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.010	01/09/15 13:37	
Arsenic	mg/L	ND	0.00050	01/09/15 13:37	
Cadmium	mg/L	ND	0.000080	01/09/15 13:37	
Calcium	mg/L	ND	0.040	01/09/15 13:37	
Copper	mg/L	ND	0.0010	01/09/15 13:37	
Iron	mg/L	ND	0.050	01/09/15 13:37	
Lead	mg/L	ND	0.00010	01/09/15 13:37	
Magnesium	mg/L	ND	0.010	01/09/15 13:37	
Silver	mg/L	ND	0.00050	01/09/15 13:37	
Uranium-238	mg/L	ND	0.00050	01/09/15 13:37	
Zinc	mg/L	ND	0.0050	01/09/15 13:37	

LABORATORY CONTROL SAMPLE: 1878533

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	.08	0.083	103	85-115	
Arsenic	mg/L	.08	0.083	104	85-115	
Cadmium	mg/L	.08	0.086	108	85-115	
Calcium	mg/L	1	0.98	98	85-115	
Copper	mg/L	.08	0.087	109	85-115	
Iron	mg/L	1	1.1	108	85-115	
Lead	mg/L	.08	0.088	110	85-115	
Magnesium	mg/L	1	1.1	108	85-115	
Silver	mg/L	.08	0.082	103	85-115	
Uranium-238	mg/L	.08	0.086	107	85-115	
Zinc	mg/L	.08	0.086	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1878845 1878846

Parameter	Units	10293057002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	0.0049J	.08	.08	0.090	0.089	106	105	70-130	1	20	
Arsenic	mg/L	0.0017	.08	.08	0.086	0.086	106	105	70-130	0	20	
Cadmium	mg/L	0.00018	.08	.08	0.086	0.086	108	107	70-130	0	20	
Calcium	mg/L	111	1	1	113	113	197	192	70-130	0	20	E,M1
Copper	mg/L	0.0068	.08	.08	0.094	0.095	109	110	70-130	1	20	
Iron	mg/L	0.014J	1	1	1.1	1.1	108	109	70-130	1	20	
Lead	mg/L	0.00011	.08	.08	0.088	0.088	110	110	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1878845 1878846

Parameter	Units	10293057002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Magnesium	mg/L	35.8	1	1	37.2	36.7	136	81	70-130	1	20	M1
Silver	mg/L	ND	.08	.08	0.082	0.082	103	102	70-130	1	20	
Uranium-238	mg/L	0.0051	.08	.08	0.095	0.094	112	112	70-130	0	20	
Zinc	mg/L	0.047	.08	.08	0.13	0.14	107	111	70-130	2	20	

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QUALIFIERS

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LAO Wetlands (Weekly)
Pace Project No.: 10293057

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10293057001	**LAO-SS-1-122514**	EPA 200.8	MPRP/51703	EPA 200.8	ICPM/22945
10293057002	**LAO-SS-1-122914**	EPA 200.8	MPRP/51703	EPA 200.8	ICPM/22945
10293057003	**LAO-SS-2-122914**	EPA 200.8	MPRP/51703	EPA 200.8	ICPM/22945
10293057001	**LAO-SS-1-122514**	EPA 245.1	MERP/12470	EPA 245.1	MERC/14442
10293057002	**LAO-SS-1-122914**	EPA 245.1	MERP/12470	EPA 245.1	MERC/14442
10293057003	**LAO-SS-2-122914**	EPA 245.1	MERP/12470	EPA 245.1	MERC/14442

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Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 09May2014 Page 1 of 1
	Document No.: **F-MN-L-210-rev.12**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP - Pioneer

Project #: WO#: 10293057

10293057

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other: _____

Tracking Number: 8053 8435 2490

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other: _____ **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A9130516413 ☐ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.8 **Cooler Temp Corrected (°C):** 1.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ NA

Temp should be above freezing to 6°C **Correction Factor:** true **Date and Initials of Person Examining Contents:** 12-30-14/MT

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 1-2 2/2 3 1/1
Per method, VOA pH is checked after analysis				Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time:	Temp:	Corrected Temp:
Time:	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: _____ **Date:** 12/30/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Laboratory Management Program LaMP Chain of Custody Record

bp rm

Page _____ of _____

BP Site Node Path: BP_USA_MT_SILVER BOW_Butte Priority Soils

Req Due Date (mm/dd/yy): _____ Rush TAT: Yes ____ No x

BP Facility No: LAO Wetlands (Weekly)

Lab Work Order Number: 10293057

Lab Name: Pace Analytical Services	Facility Address: 820 Centennial	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code: Butte, MT 59701	Consultant/Contractor Project No:
Lab PM: Julie Thieschafer	Lead Regulatory Agency: MTDEQ	Address: 6301/2 W Broadway, Butte MT 59701
Lab Phone: 612-607-6363 612-437-2613	California Global ID No.:	Consultant/Contractor PM: Dave Griffis
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-563-9371 Email: dave.griffis@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision ____ OOC-BU ____ OOC-RM ____	Email EDD To: and to lab.enfosdoc@bp.com
Other Info:	Stage: Activity:	Invoice To: BP x Contractor ____

BP Project Manager (PM): Shannon Dunlap

BP PM Phone: 406-782-9964

BP PM Email:

Report Type & QC Level: Standard x; Full Data Package ____

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol		Total Recoverable Metals by 200.8 (Al, Ca, Mg, As, cd, Cu, Fe, Pb, Hg, Ag, Uranium, Zn)	Dissolved Metals (HOLD)							Comments (Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.)
	LAO-SS-1-122514	12/25/14	13:30		X						2				X		X						001
	LAO-SS-1-122914	12/29/14	11:30		X						2				X		X						002
	LAO-SS-2-122914	12/29/14	12:00		X						1				X								003

	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Name: T. Hickey						
Sampler's Company: Pioneer Technical Services	Thomas Hickey / PTS	12/29/14	1600	[illegible] / PACE	12/30/14	1010
Shipment Method: Fed Ex Ship Date: 12/29/14						
Shipment Tracking No: 805384352490						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

APPENDIX D4

Sub-drainage Stormwater Best Management Practices Effectiveness Estimate

Appendix D4: Sub-drainage Stormwater Best Management Practices Effectiveness Estimate

Purpose

To determine the estimated ranges of effectiveness for various Best Management Practices (BMPs) if they were to be installed within the Butte Priority Soils Operable Unit (BPSOU).

Assumptions, Variables, and Constraints

This analysis was conducted to estimate a range of effectiveness values for BMPs (i.e., contaminant reductions in stormwater) for use in the TI evaluation. After the major efforts of the stormwater time critical removal actions (TCRA) were completed in the late 1990's and early 2000's, the next set of BMP improvements were constructed starting in 2010. As a result, water quality data was available for some of the BPSOU sub-drainages pre- and post-BMP installation.

To detect changes in water quality, two-year rolling averages were calculated using data between April 1 and October 1 of each year. The data was constrained to ensure only wet weather events were represented, and ensuring snowmelt events were excluded. In addition, only data for total recoverable copper concentrations were used. Averages were calculated by two methods: 1) using all available data for a given station (all ISCO data, all field grabs, and all automatic samples); and 2) using only the "first flush" data (includes only first two ISCO samples, field grabs, and automatic samples). This was undertaken for each sub-drainage where sufficient data were available.

Stormwater data from 2008 and 2009 were used as pre-BMP baseline conditions and compared against post-BMP data. This resulted in the comparison of averages from the 2010/2011, 2011/2012, 2012/2013, and 2013/2014 intervals against the baseline 2008/2009 interval. From these comparisons, the BMPs that were installed during the timeframe evaluated were assigned a portion of the calculated effectiveness value. The BMPs installed or implemented during this timeframe are described further below and are also illustrated on the surface water-related construction activities timeline (see Figure 3-1 in the Surface Water Characterization Report in Appendix A):

1. Source Controls: Source controls are actions designed to mitigate soil erosion and sediment loading into stormwater. They include measures such as constructing caps and covers, storm channels, storm pipes, site grading, paving, and riprap slope protection.
2. Hydrodynamic Devices (HDD): These pre-cast concrete devices are designed to separate and capture sediment, trash, debris, grease, and oils. The HDD sites are located near the base of the Butte Hill and are located on existing stormwater mains up-gradient from the stormwater outfalls. The locations are Warren Avenue, Buffalo Gulch, Anaconda Road, Texas Avenue, and Montana Street; however, only Buffalo Gulch and Anaconda Road had sufficient influent and effluent data to evaluate effectiveness.

3. General Maintenance: General maintenance actions include cleaning out sediment buildup in manholes, catch basins, and ditches to mitigate flushing of contaminated sediments during wet weather events. The effectiveness is generally a function of frequency of scheduled maintenance.
4. Curb and Gutter Improvements: The primary objective of the curb and gutter and valley gutter improvements are to direct stormwater runoff to existing or newly constructed storm inlets or stormwater ditches. Previous site conditions allowed stormwater runoff to flow onto unreclaimed or reclaimed source areas and erode potentially contaminated soils.
5. Slip Lining: Slip lining involves placing a new liner of fiberglass or plastic within an existing storm sewer pipe. The lining helps to prevent sediment from infiltrating into the stormwater line from cracked pipes or offset pipe joints. Slip lining was performed on existing trunk lines at Anaconda Road and Buffalo Gulch.

Stormwater quality and quantity are inherently variable, making this assessment subject to uncertainty. For example, stormwater concentration data exhibit significant variability due to factors such as precipitation, antecedent conditions, flow rate, sediment loading, maintenance schedules, sampling techniques, street drain loading, groundwater infiltration into storm sewer, and other standard field and/or laboratory errors. A correlation evaluation between wet weather events and effectiveness values was conducted, however, limited degrees of correlations were observed. As a result, the conclusions made are best estimates based on system and data variables.

Estimated Effectiveness Values

A range of BMP effectiveness values were estimated using this analysis technique with a summary of the ranges calculated in this evaluation included in table D4-1, below. The ranges are based on available data for each of the BMPs, and then applied to the overall reductions seen in an individual sub-drainage. For example, the assumption was made that general stormwater maintenance contributed to 10% reduction within a sub-basin. The total overall reduction calculated from water quality within the Buffalo Gulch sub-basin is 57%, when comparing 2008/2009 data to 2013/2014 data. Therefore, the contribution from the general stormwater maintenance was calculated as 10% x 57% = ~6% for this sub-basin. This procedure – calculating an overall effectiveness for the entire sub-basin based on water quality data then applying individual BMP effectiveness assumptions to those values resulted in ranges of effectiveness that were used in the model. The ranges were calculated because each sub-basin had different total reductions as a result of the constructed BMPs, but in the model, a single effectiveness was used. For the hydrodynamic devices, a device efficiency for Buffalo Gulch was calculated based sampling data, and that same device efficiency was applied to other sub-basins that have the devices installed.

Table D4-1: BMP Effectiveness Values

BMPs (General)	Effectiveness Reduction Range (%)
Hydrodynamic Devices (HDD)	11-37%
Source Controls	3-10%
General Maintenance	1-6 %
Curb and Gutter Program	1-3%
Slip Lining	2-3%

Calculations, Graphs, and Data Sheets

The calculations, graphs, and data sheets are provided on the following subsequent pages and are organized as follows:

- Buffalo Gulch total recoverable copper data plot compared with BMP construction timeline.
- Total recoverable copper data (all data) plotted over time.
- Total recoverable copper data at Buffalo Gulch (all data and first flush data), Warren Avenue (all data), WSD (all data), and hydrodynamic devices (Buffalo Gulch and Anaconda Road).
- Precipitation data and correlation between precipitation and total recoverable copper data at the Buffalo Gulch outlet.

Buffalo Gulch BMP Effectiveness Summary

Sensitivity Factors

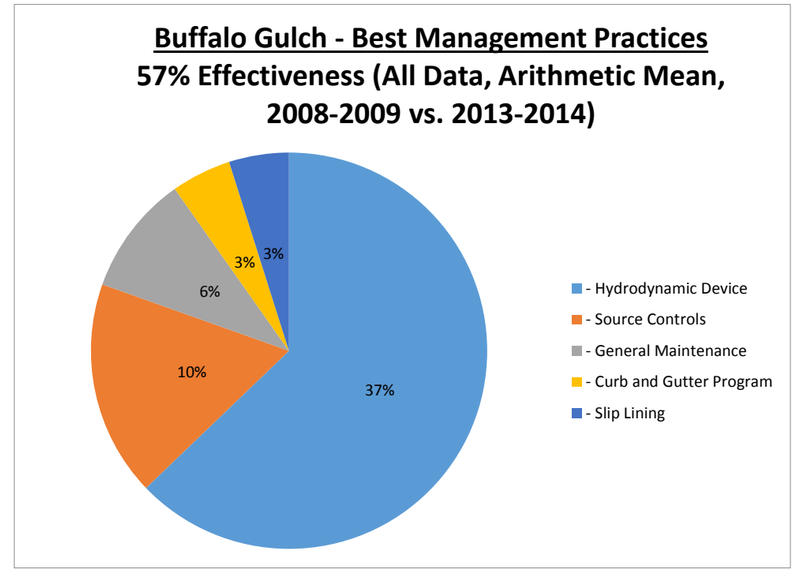
- Wet Weather Events: No Correlation With Precipitation
- Data Set Selection: All Data
- Comparative Timeframe for Effectiveness: 2008/2009 vs. 2013/2014
- Statistical Method: Simple Averaging

Data Summary (ALL DATA)

Total Copper - BG Outlet			Precipitation		
Effectiveness (2008-2009 vs. 2010/2011):	-8%	Gain	2008-2009 vs. 2010/2011:	-31%	Increased Avg. Precip
Effectiveness (2008-2009 vs. 2011/2012):	-83%	Gain	2008-2009 vs. 2011/2012:	6%	Decreased Avg. Precip
Effectiveness (2008-2009 vs. 2012/2013):	16%	Reduction	2008-2009 vs. 2012/2013:	4%	Decreased Avg. Precip
Effectiveness (2008-2009 vs. 2013/2014):	57%	Reduction	2008-2009 vs. 2013/2014:	-23%	Increased Avg. Precip

BMPs	Effectiveness	6-Year Effectiveness Evaluation (2008 to 2014)
- Hydrodynamic Device	37%	Fixed (Avg. Effectiveness for BG) (~62%)
- Source Controls	10%	Variable (~18%)
- General Maintenance	6%	Fixed Assumption (~10%)
- Curb and Gutter Program	3%	Fixed Assumption (~5%)
- Slip Lining	3%	Fixed Assumption (~5%)
SUBDRAINAGE TOTAL:	**57%**	**Effectiveness - First & Last 2-Year Composite**

*Rounding accounts for the slight difference in the summed effectiveness values.



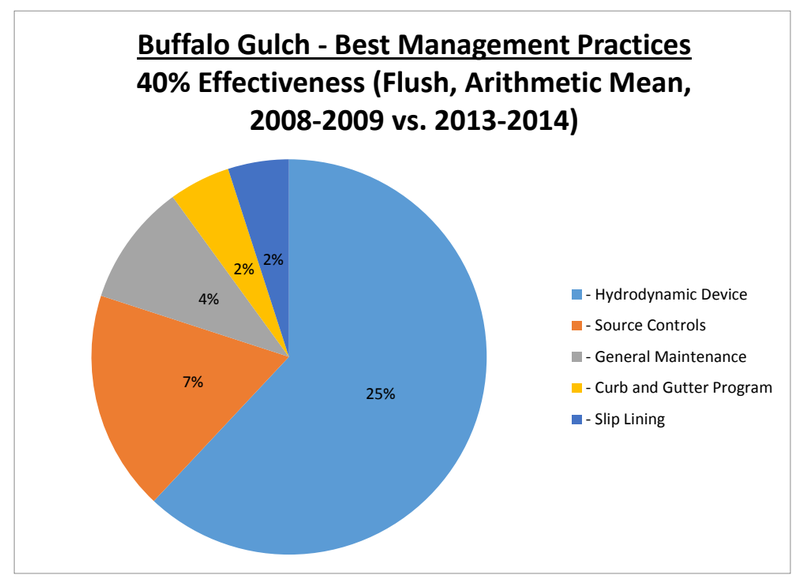
Sensitivity Factors

- Wet Weather Events: No Correlation With Precipitation
- Data Set Selection: Flsuh Data
- Comparative Timeframe for Effectiveness: 2008/2009 vs. 2013/2014
- Statistical Method: Simple Averaging

Data Summary (FLUSH DATA - AS, FG, IS1, IS2)

Total Copper - BG Outlet			Precipitation		
Effectiveness (2008-2009 vs. 2010/2011):	-8%	Gain	2008-2009 vs. 2010/2011:	-31%	Increased Avg. Precip
Effectiveness (2008-2009 vs. 2011/2012):	-83%	Gain	2008-2009 vs. 2011/2012:	6%	Decreased Avg. Precip
Effectiveness (2008-2009 vs. 2012/2013):	-23%	Gain	2008-2009 vs. 2012/2013:	4%	Decreased Avg. Precip
Effectiveness (2008-2009 vs. 2013/2014):	40%	Reduction	2008-2009 vs. 2013/2014:	-23%	Increased Avg. Precip

BMPs	Effectiveness	6-Year Effectiveness Evaluation (2008 to 2014)
- Hydrodynamic Device	25%	Fixed (Avg. Effectiveness for BG) (~62%)
- Source Controls	7%	Variable (~18%)
- General Maintenance	4%	Fixed Assumption (~10%)
- Curb and Gutter Program	2%	Fixed Assumption (~5%)
- Slip Lining	2%	Fixed Assumption (~5%)
SUBDRAINAGE TOTAL:	**40%**	**Effectiveness - First & Last 2-Year Composite**



Warren Avenue Effectiveness Summary

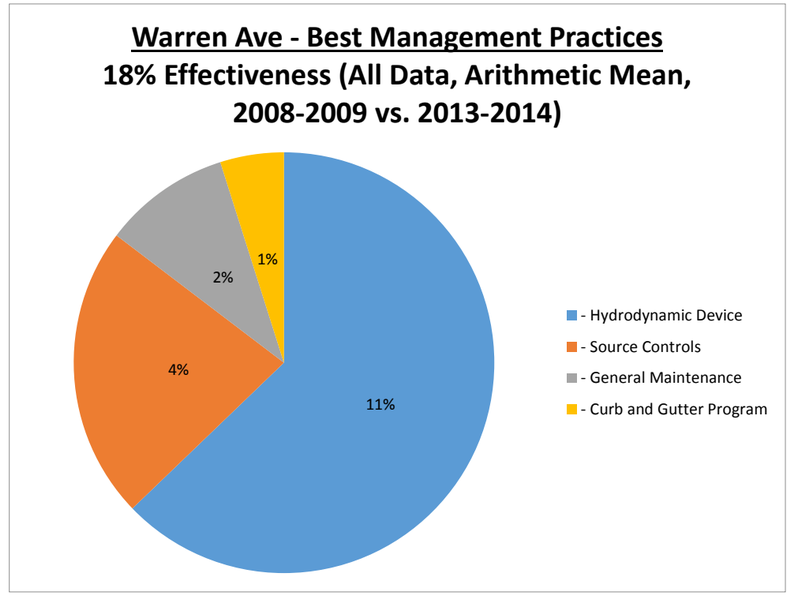
Sensitivity Factors

- Wet Weather Events: No Correlation With Precipitation
- Data Set Selection: All Data
- Comparative Timeframe for Effectiveness: 2008/2009 vs. 2013/2014
- Statistical Method: Simple Averaging

Data Summary (ALL DATA)

Total Copper - WA Outlet		Precipitation	
Effectiveness (2008-2009 vs. 2010/2011):	**8% Reduction**	**2008-2009 vs. 2010/2011:**	**-31% Increased Avg. Precip**
Effectiveness (2008-2009 vs. 2011/2012):	**21% Reduction**	**2008-2009 vs. 2011/2012:**	**6% Decreased Avg. Precip**
Effectiveness (2008-2009 vs. 2012/2013):	**11% Reduction**	**2008-2009 vs. 2012/2013:**	**4% Decreased Avg. Precip**
Effectiveness (2008-2009 vs. 2013/2014):	**18% Reduction**	**2008-2009 vs. 2013/2014:**	**-23% Increased Avg. Precip**

BMPs	Effectiveness	6-Year Effectiveness Evaluation (2008 to 2014)
- Hydrodynamic Device	11%	Avg. Effectiveness for BG HD (~64%)
- Source Controls	4%	General Assumption (~23%)
- General Maintenance	2%	General Assumption (~10%)
- Curb and Gutter Program	1%	General Assumption (~5%)
SUBDRAINAGE TOTAL:	**18%**	**Effectiveness - First & Last 2-Year Composite**



WSD Effectiveness Summary

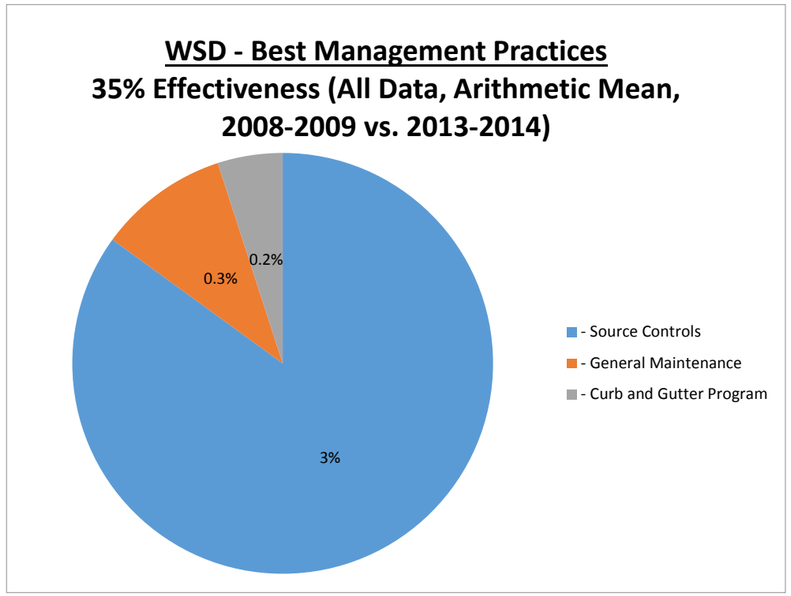
Sensitivity Factors

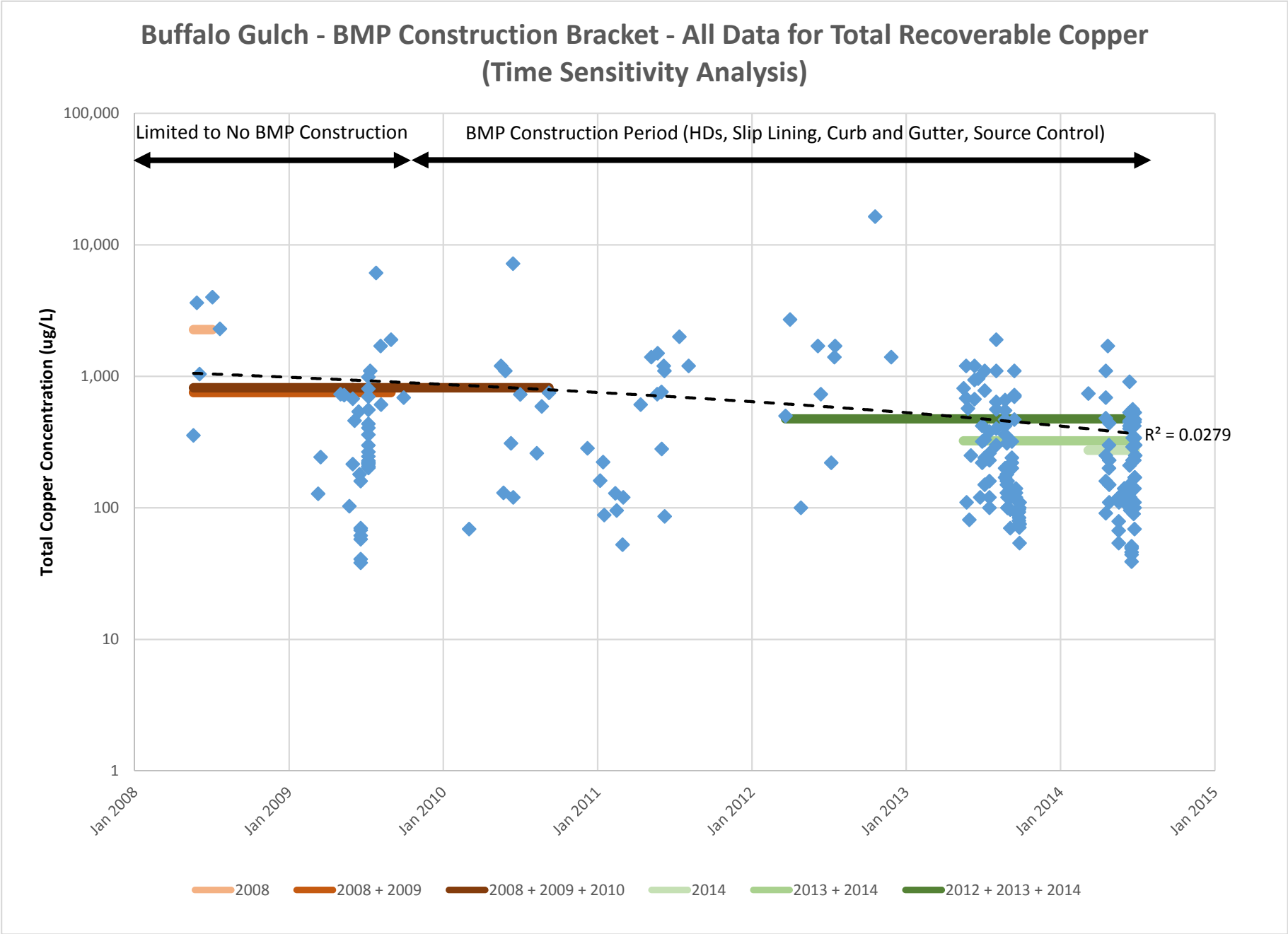
- Wet Weather Events: No Correlation With Precipitation
- Data Set Selection: All Data
- Comparative Timeframe for Effectiveness: 2008/2009 vs. 2013/2014
- Statistical Method: Simple Averaging

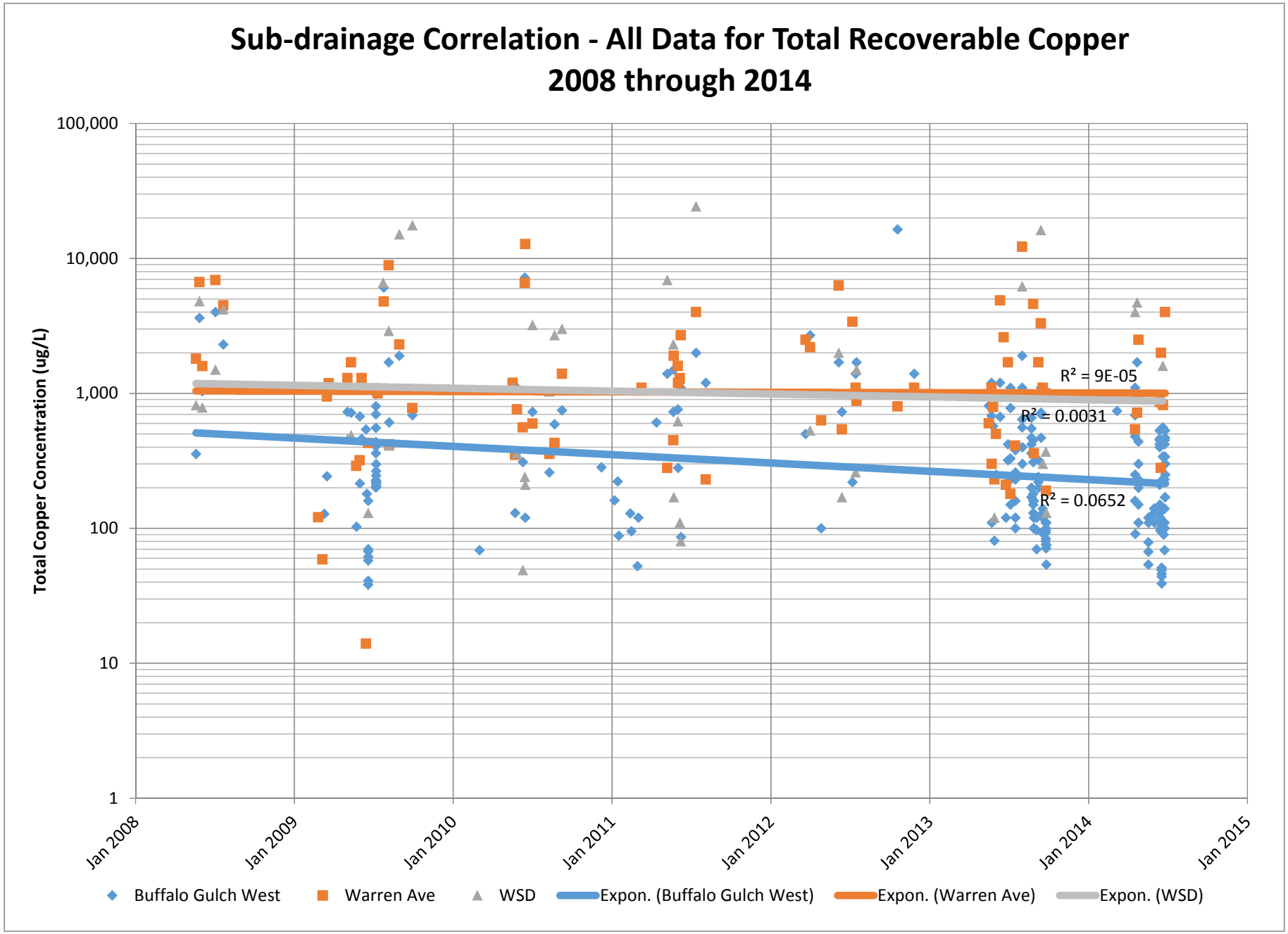
Data Summary (ALL DATA)

Total Copper - MG Outlet		Precipitation	
Effectiveness (2008-2009 vs. 2010/2011):	**25% Reduction**	**2008-2009 vs. 2010/2011:**	**-31% Increased Avg. Precip**
Effectiveness (2008-2009 vs. 2011/2012):	**16.09% Reduction**	**2008-2009 vs. 2011/2012:**	**5.8% Decreased Avg. Precip**
Effectiveness (2008-2009 vs. 2012/2013):	**35% Reduction**	**2008-2009 vs. 2012/2013:**	**4% Decreased Avg. Precip**
Effectiveness (2008-2009 vs. 2013/2014):	**3% Reduction**	**2008-2009 vs. 2013/2014:**	**-23% Increased Avg. Precip**

BMPs	Effectiveness	6-Year Effectiveness Evaluation (2008 to 2013)
- Source Controls	3%	General Assumption (~85%)
- General Maintenance	0.3%	General Assumption (~10%)
- Curb and Gutter Program	0.2%	General Assumption (~5%)
SUBDRAINAGE TOTAL:	**3%**	**Effectiveness - First & Last 2-Year Composite**




Buffalo Gulch - BMP Construction Bracket - All Data for Total Recoverable Copper
(Time Sensitivity Analysis)
Limited to No BMP Construction
BMP Construction Period (HDs, Slip Lining, Curb and Gutter, Source Control)
Total Copper Concentration (ug/L)
100,000
10,000
1,000
100
10
1
Jan 2008
Jan 2009
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 2014
Jan 2015
R² = 0.0279
2008
2008 + 2009
2008 + 2009 + 2010
2014
2013 + 2014
2012 + 2013 + 2014


Sub-drainage Correlation - All Data for Total Recoverable Copper
2008 through 2014
Total Copper Concentration (ug/L)
100,000
10,000
1,000
100
10
1
Jan 2008
Jan 2009
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 2014
Jan 2015
R² = 9E-05
R² = 0.0031
R² = 0.0652
Buffalo Gulch West
Warren Ave
WSD
Expon. (Buffalo Gulch West)
Expon. (Warren Ave)
Expon. (WSD)

ALL DATA

SAMPLE_DEL_GROUP	SAMPLE_DATE	SAMPLE_TYPE_CODE	COPPER_TR	UNIT
BG-01	5/20/2008 22:00	AS	356	ug/L
BG-01	5/28/2008 17:45	AS	3620	ug/L
BG-01	6/4/2008 8:00	AS	1040	ug/L
BG-01	7/4/2008 16:15	AS	4000	ug/L
BG-01	7/22/2008 14:30	AS	2300	ug/L
BG-01	3/11/2009 15:48	FG	128	ug/L
BG-01	3/17/2009 16:00	FG	243	ug/L
BG-01	5/3/2009 23:00	AS	730	ug/L
BG-01	5/12/2009 10:15	AS	720	ug/L
BG-01	5/24/2009 14:30	FG	103	ug/L
BG-01	6/1/2009 15:17	FG	215	ug/L
BG-01	6/1/2009 14:25	FG	676	ug/L
BG-01	6/5/2009 17:15	AS	460	ug/L
BG-01	6/15/2009 14:30	AS	540	ug/L
BG-01	6/17/2009 17:47	FG	180	ug/L
BG-01	6/20/2009 10:55	FG	67.6	ug/L
BG-01	6/20/2009 11:05	FG	70.1	ug/L
BG-01	6/20/2009 11:15	FG	61.6	ug/L
BG-01	6/20/2009 11:25	FG	38.3	ug/L
BG-01	6/20/2009 11:35	FG	40.8	ug/L
BG-01	6/20/2009 11:45	FG	57.7	ug/L
BG-01	6/20/2009 14:45	AS	160	ug/L
BG-01	7/8/2009 12:33	FG	228	ug/L
BG-01	7/8/2009 12:40	FG	201	ug/L
BG-01	7/8/2009 12:45	FG	988	ug/L
BG-01	7/8/2009 12:50	FG	804	ug/L
BG-01	7/8/2009 12:55	FG	700	ug/L
BG-01	7/8/2009 13:00	FG	556	ug/L
BG-01	7/8/2009 13:05	FG	436	ug/L
BG-01	7/8/2009 13:10	FG	405	ug/L
BG-01	7/8/2009 13:15	FG	360	ug/L
BG-01	7/8/2009 13:20	FG	299	ug/L
BG-01	7/8/2009 13:30	FG	266	ug/L
BG-01	7/8/2009 13:40	FG	246	ug/L
BG-01	7/8/2009 13:50	FG	223	ug/L
BG-01	7/8/2009 14:00	FG	205	ug/L
BG-01	7/8/2009 14:10	FG	207	ug/L
BG-01	7/8/2009 14:20	FG	220	ug/L
BG-01	7/8/2009 14:30	FG	216	ug/L
BG-01	7/8/2009 14:40	FG	216	ug/L
BG-01	7/12/2009 22:45	AS	1100	ug/L
BG-01	7/26/2009 14:00	AS	6100	ug/L
BG-01	8/6/2009 15:00	AS	1700	ug/L
BG-01	8/7/2009 17:30	AS	610	ug/L
BG-01	8/30/2009 23:00	AS	1900	ug/L
BG-01	9/30/2009 0:30	AS	690	ug/L
BG-01	3/3/2010 17:05	FG	69	ug/L
BG-01	5/18/2010 14:30	AS	1200	ug/L
BG-01	5/24/2010 10:16	AS	130	ug/L
BG-01	5/28/2010 9:00	AS	1100	ug/L
BG-01	6/11/2010 0:30	AS	310	ug/L
BG-01	6/15/2010 13:45	AS	7200	ug/L
BG-01	6/16/2010 10:48	FG	120	ug/L
BG-01	7/3/2010 1:45	AS	729	ug/L
BG-01	8/10/2010 18:45	AS	260	ug/L
BG-01	8/22/2010 21:00	AS	590	ug/L
BG-01	9/8/2010 20:15	AS	750	ug/L
BG-01	12/8/2010 17:10	FG	284	ug/L
BG-01	1/7/2011 17:10	FG	161	ug/L
BG-01	1/14/2011 17:30	FG	223	ug/L
BG-01	1/17/2011 18:20	FG	88.1	ug/L
BG-01	2/12/2011 17:30	FG	129	ug/L
BG-01	2/15/2011 18:10	FG	95.3	ug/L
BG-01	3/1/2011 17:58	FG	52.5	ug/L
BG-01	3/3/2011 17:12	FG	120	ug/L
BG-01	4/13/2011 19:00	AS	610	ug/L
BG-01	5/8/2011 18:45	AS	1400	ug/L

ALL DATA

Total Copper - BG Outlet	
Effectiveness (2008-2009 vs. 2010/2011):	**-8% Gain**
Effectiveness (2008-2009 vs. 2011/2012):	**-83% Gain**
Effectiveness (2008-2009 vs. 2012/2013):	**16% Reduction**
Effectiveness (2008-2009 vs. 2013/2014):	**57% Reduction**

*** Through June 2014

BG-01	5/22/2011 21:45	AS	730	ug/L
BG-01	5/23/2011 21:30	AS	1500	ug/L
BG-01	6/2/2011 3:00	AS	760	ug/L
BG-01	6/2/2011 15:00	AS	280	ug/L
BG-01	6/7/2011 2:00	AS	1200	ug/L
BG-01	6/8/2011 18:45	AS	1100	ug/L
BG-01	6/9/2011 10:30	FG	86	ug/L
BG-01	7/14/2011 7:45	AS	2000	ug/L
BG-01	8/5/2011 9:00	AS	1200	ug/L
BG-01	3/21/2012 13:45	AS	500	ug/L
BG-01	4/1/2012 1:00	AS	2700	ug/L
BG-01	4/26/2012 19:00	AS	100	ug/L
BG-01	6/5/2012 18:30	AS	1700	ug/L
BG-01	6/13/2012 2:30	AS	730	ug/L
BG-01	7/7/2012 17:30	AS	220	ug/L
BG-01	7/14/2012 21:00	AS	1400	ug/L
BG-01	7/16/2012 14:30	AS	1700	ug/L
BG-01	10/19/2012 8:23	AS	16400	ug/L
BG-01	11/26/2012 11:03	AS	1400	ug/L
BG-01	5/16/2013 16:00	AS	810	ug/L
BG-CLV-1	5/22/2013 21:29	IS1	680	ug/L
BG-01	5/22/2013 21:30	AS	1200	ug/L
BG-01	5/23/2013 19:00	AS	110	ug/L
BG-01	5/26/2013 19:30	AS	570	ug/L
BG-01	5/30/2013 0:30	AS	81	ug/L
BG-01	6/2/2013 19:45	AS	250	ug/L
BG-CLV-1	6/11/2013 15:00	IS1	1200	ug/L
BG-CLV-1	6/11/2013 15:15	IS2	940	ug/L
BG-CLV-1	6/11/2013 15:30	IS3	670	ug/L
BG-01	6/19/2013 18:00	AS	960	ug/L
BG-01	6/24/2013 22:45	AS	120	ug/L
BG-CLV-1	6/29/2013 15:35	IS1	420	ug/L
BG-CLV-1	6/29/2013 15:50	IS2	320	ug/L
BG-CLV-1	6/29/2013 16:05	IS3	220	ug/L
BG-CLV-1	7/5/2013 16:47	IS1	1100	ug/L
BG-CLV-1	7/5/2013 17:02	IS2	780	ug/L
BG-CLV-1	7/5/2013 17:17	IS3	330	ug/L
BG-CLV-1	7/5/2013 17:47	IS4	240	ug/L
BG-CLV-1	7/5/2013 18:17	IS5	150	ug/L
BG-CLV-1	7/16/2013 22:26	IS1	260	ug/L
BG-CLV-1	7/16/2013 22:41	IS2	380	ug/L
BG-CLV-1	7/16/2013 22:56	IS3	230	ug/L
BG-CLV-1	7/16/2013 23:26	IS4	120	ug/L
BG-CLV-1	7/16/2013 23:56	IS5	100	ug/L
BG-CLV-1	7/17/2013 0:56	IS6	160	ug/L
BG-CLV-1	8/1/2013 16:04	IS1	560	ug/L
BG-CLV-1	8/1/2013 16:19	IS2	1100	ug/L
BG-CLV-1	8/1/2013 16:34	IS3	1900	ug/L
BG-CLV-1	8/1/2013 17:04	IS4	640	ug/L
BG-CLV-1	8/1/2013 17:34	IS5	400	ug/L
BG-CLV-1	8/1/2013 18:34	IS6	300	ug/L
BG-CLV-1	8/22/2013 15:55	IS1	550	ug/L
BG-CLV-1	8/22/2013 16:10	IS2	660	ug/L
BG-CLV-1	8/22/2013 16:25	IS3	470	ug/L
BG-CLV-1	8/22/2013 16:55	IS4	420	ug/L
BG-CLV-1	8/22/2013 17:25	IS5	360	ug/L
BG-CLV-1	8/22/2013 20:52	IS6	200	ug/L
BG-CLV-1	8/22/2013 21:53	IS7	170	ug/L
BG-CLV-1	8/26/2013 18:16	IS1	450	ug/L
BG-CLV-1	8/26/2013 18:31	IS2	310	ug/L
BG-CLV-1	8/26/2013 18:46	IS3	150	ug/L
BG-CLV-1	8/26/2013 19:16	IS4	180	ug/L
BG-CLV-1	8/26/2013 19:46	IS5	160	ug/L
BG-CLV-1	8/26/2013 21:16	IS6	130	ug/L
BG-CLV-1	8/28/2013 13:55	IS1	160	ug/L
BG-CLV-1	8/28/2013 14:10	IS2	120	ug/L
BG-CLV-1	8/28/2013 14:25	IS3	100	ug/L
BG-CLV-1	8/28/2013 14:55	IS4	100	ug/L
BG-CLV-1	9/3/2013 19:23	IS1	70	ug/L

BG-CLV-1	9/3/2013 19:38	IS2	120	ug/L
BG-CLV-1	9/3/2013 19:53	IS3	97	ug/L
BG-CLV-1	9/7/2013 16:39	IS1	220	ug/L
BG-CLV-1	9/7/2013 16:54	IS2	320	ug/L
BG-CLV-1	9/7/2013 17:09	IS3	240	ug/L
BG-CLV-1	9/7/2013 17:39	IS4	200	ug/L
BG-CLV-1	9/13/2013 15:55	IS1	700	ug/L
BG-CLV-1	9/13/2013 16:10	IS2	710	ug/L
BG-CLV-1	9/13/2013 16:25	IS3	1100	ug/L
BG-CLV-1	9/13/2013 16:55	IS4	470	ug/L
BG-CLV-1	9/13/2013 17:25	IS5	720	ug/L
BG-CLV-1	9/17/2013 11:34	IS1	130	ug/L
BG-CLV-1	9/17/2013 11:49	IS2	140	ug/L
BG-CLV-1	9/17/2013 12:04	IS3	120	ug/L
BG-CLV-1	9/17/2013 12:34	IS4	92	ug/L
BG-CLV-1	9/24/2013 13:28	IS1	80	ug/L
BG-CLV-1	9/24/2013 13:43	IS2	110	ug/L
BG-CLV-1	9/24/2013 13:58	IS3	110	ug/L
BG-CLV-1	9/24/2013 14:28	IS4	93	ug/L
BG-CLV-1	9/24/2013 14:58	IS5	97	ug/L
BG-CLV-1	9/24/2013 15:58	IS6	84	ug/L
BG-CLV-1	9/25/2013 12:22	IS1	76	ug/L
BG-CLV-1	9/25/2013 12:37	IS2	110	ug/L
BG-CLV-1	9/25/2013 12:52	IS3	100	ug/L
BG-CLV-1	9/25/2013 13:22	IS4	71	ug/L
BG-CLV-1	9/25/2013 20:55	IS5	110	ug/L
BG-CLV-1	9/25/2013 21:26	IS6	75	ug/L
BG-CLV-1	9/25/2013 22:26	IS7	54	ug/L
BG-01	3/7/14 4:00 PM	AS	740	ug/L
BG-CLV-1	4/18/14 1:49 AM	IS1	1100	ug/L
BG-CLV-1	4/18/14 2:04 AM	IS2	690	ug/L
BG-CLV-1	4/18/14 2:19 AM	IS3	480	ug/L
BG-CLV-1	4/18/14 2:49 AM	IS4	250	ug/L
BG-CLV-1	4/18/14 3:19 AM	IS5	160	ug/L
BG-CLV-1	4/18/14 4:19 AM	IS6	91	ug/L
BG-01	4/22/14 2:35 PM	AS	1700	ug/L
BG-CLV-1	4/25/14 5:26 PM	IS1	200	ug/L
BG-CLV-1	4/25/14 5:41 PM	IS2	300	ug/L
BG-CLV-1	4/25/14 5:52 PM	IS3	230	ug/L
BG-CLV-1	4/25/14 6:26 PM	IS4	150	ug/L
BG-CLV-1	4/25/14 6:56 PM	IS5	110	ug/L
BG-CLV-1	4/25/14 7:56 PM	IS6	440	ug/L
BG-CLV-1	5/18/14 1:54 PM	IS1	54	ug/L
BG-CLV-1	5/18/14 2:09 PM	IS2	67	ug/L
BG-CLV-1	5/18/14 2:24 PM	IS3	79	ug/L
BG-CLV-1	5/18/14 6:45 PM	IS4	110	ug/L
BG-CLV-1	5/18/14 7:16 PM	IS5	120	ug/L
BG-CLV-1	5/18/14 7:46 PM	IS6	120	ug/L
BG-CLV-1	6/1/14 1:46 AM	IS4	140	ug/L
BG-CLV-1	6/1/14 2:17 AM	IS5	140	ug/L
BG-CLV-1	6/1/14 2:47 AM	IS6	130	ug/L
BG-CLV-1	6/1/14 1:57 PM	IS7	110	ug/L
BG-CLV-1	6/1/14 2:58 PM	IS8	140	ug/L
BG-CLV-1	6/13/14 5:14 AM	IS1	910	ug/L
BG-CLV-1	6/13/14 5:29 AM	IS2	530	ug/L
BG-CLV-1	6/13/14 5:44 AM	IS3	400	ug/L
BG-CLV-1	6/13/14 9:58 AM	IS4	210	ug/L
BG-CLV-1	6/13/14 10:24 AM	IS5	420	ug/L
BG-CLV-1	6/13/14 10:55 AM	IS6	450	ug/L
BG-CLV-1	6/13/14 11:23 AM	IS7	460	ug/L
BG-CLV-1	6/13/14 9:04 PM	IS1	130	ug/L
BG-CLV-1	6/13/14 9:19 PM	IS2	140	ug/L
BG-CLV-1	6/13/14 9:51 PM	IS3	140	ug/L
BG-CLV-1	6/13/14 10:07 PM	IS4	150	ug/L
BG-CLV-1	6/14/14 6:38 PM	IS5	100	ug/L
BG-CLV-1	6/14/14 7:09 PM	IS6	96	ug/L
BG-CLV-1	6/14/14 8:24 PM	IS7	120	ug/L
BG-CLV-1	6/14/14 8:55 PM	IS8	110	ug/L
BG-CLV-1	6/17/14 8:14 PM	IS1	50	ug/L

BG-CLV-1	6/17/14 8:29 PM	IS2	51	ug/L
BG-CLV-1	6/17/14 8:44 PM	IS3	49	ug/L
BG-CLV-1	6/17/14 9:14 PM	IS4	44	ug/L
BG-CLV-1	6/17/14 9:44 PM	IS5	39	ug/L
BG-CLV-1	6/17/14 10:44 PM	IS6	46	ug/L
BG-CLV-1	6/20/14 11:45 AM	IS1	230	ug/L
BG-CLV-1	6/20/14 12:00 PM	IS2	290	ug/L
BG-CLV-1	6/20/14 12:15 PM	IS3	230	ug/L
BG-CLV-1	6/20/14 4:26 PM	IS4	560	ug/L
BG-CLV-1	6/20/14 4:57 PM	IS5	340	ug/L
BG-CLV-1	6/20/14 5:27 PM	IS6	290	ug/L
BG-CLV-1	6/22/14 4:00 PM	IS7	90	ug/L
BG-CLV-1	6/24/14 4:22 PM	IS1	420	ug/L
BG-CLV-1	6/24/14 4:37 PM	IS2	230	ug/L
BG-CLV-1	6/24/14 5:54 PM	IS3	450	ug/L
BG-CLV-1	6/24/14 6:10 PM	IS4	340	ug/L
BG-CLV-1	6/24/14 6:40 PM	IS5	140	ug/L
BG-CLV-1	6/24/14 7:10 PM	IS6	110	ug/L
BG-CLV-1	6/24/14 9:22 PM	IS7	69	ug/L
BG-CLV-1	6/25/14 1:09 AM	IS8	100	ug/L
BG-CLV-1	6/25/14 3:38 PM	IS1	530	ug/L
BG-CLV-1	6/25/14 3:53 PM	IS2	470	ug/L
BG-CLV-1	6/25/14 4:08 PM	IS3	340	ug/L
BG-CLV-1	6/25/14 4:38 PM	IS4	170	ug/L
BG-CLV-1	6/25/14 5:08 PM	IS5	170	ug/L
BG-CLV-1	6/26/14 11:51 AM	IS6	300	ug/L
BG-CLV-1	6/26/14 12:52 PM	IS7	250	ug/L

FLUSH DATA (AS, FG, IS1, IS2)

SAMPLE_DEL_GROUP	SAMPLE_DATE	SAMPLE_TYPE_CODE	COPPER_TR	UNIT
BG-01	5/20/2008 22:00	AS	356	ug/L
BG-01	5/28/2008 17:45	AS	3620	ug/L
BG-01	6/4/2008 8:00	AS	1040	ug/L
BG-01	7/4/2008 16:15	AS	4000	ug/L
BG-01	7/22/2008 14:30	AS	2300	ug/L
BG-01	3/11/2009 15:48	FG	128	ug/L
BG-01	3/17/2009 16:00	FG	243	ug/L
BG-01	5/3/2009 23:00	AS	730	ug/L
BG-01	5/12/2009 10:15	AS	720	ug/L
BG-01	5/24/2009 14:30	FG	103	ug/L
BG-01	6/1/2009 15:17	FG	215	ug/L
BG-01	6/1/2009 14:25	FG	676	ug/L
BG-01	6/5/2009 17:15	AS	460	ug/L
BG-01	6/15/2009 14:30	AS	540	ug/L
BG-01	6/17/2009 17:47	FG	180	ug/L
BG-01	6/20/2009 10:55	FG	67.6	ug/L
BG-01	6/20/2009 11:05	FG	70.1	ug/L
BG-01	6/20/2009 11:15	FG	61.6	ug/L
BG-01	6/20/2009 11:25	FG	38.3	ug/L
BG-01	6/20/2009 11:35	FG	40.8	ug/L
BG-01	6/20/2009 11:45	FG	57.7	ug/L
BG-01	6/20/2009 14:45	AS	160	ug/L
BG-01	7/8/2009 12:33	FG	228	ug/L
BG-01	7/8/2009 12:40	FG	201	ug/L
BG-01	7/8/2009 12:45	FG	988	ug/L
BG-01	7/8/2009 12:50	FG	804	ug/L
BG-01	7/8/2009 12:55	FG	700	ug/L
BG-01	7/8/2009 13:00	FG	556	ug/L
BG-01	7/8/2009 13:05	FG	436	ug/L
BG-01	7/8/2009 13:10	FG	405	ug/L
BG-01	7/8/2009 13:15	FG	360	ug/L
BG-01	7/8/2009 13:20	FG	299	ug/L
BG-01	7/8/2009 13:30	FG	266	ug/L
BG-01	7/8/2009 13:40	FG	246	ug/L
BG-01	7/8/2009 13:50	FG	223	ug/L
BG-01	7/8/2009 14:00	FG	205	ug/L
BG-01	7/8/2009 14:10	FG	207	ug/L
BG-01	7/8/2009 14:20	FG	220	ug/L
BG-01	7/8/2009 14:30	FG	216	ug/L
BG-01	7/8/2009 14:40	FG	216	ug/L
BG-01	7/12/2009 22:45	AS	1100	ug/L
BG-01	7/26/2009 14:00	AS	6100	ug/L
BG-01	8/6/2009 15:00	AS	1700	ug/L
BG-01	8/7/2009 17:30	AS	610	ug/L
BG-01	8/30/2009 23:00	AS	1900	ug/L
BG-01	9/30/2009 0:30	AS	690	ug/L
BG-01	3/3/2010 17:05	FG	69	ug/L
BG-01	5/18/2010 14:30	AS	1200	ug/L
BG-01	5/24/2010 10:16	AS	130	ug/L
BG-01	5/28/2010 9:00	AS	1100	ug/L
BG-01	6/11/2010 0:30	AS	310	ug/L
BG-01	6/15/2010 13:45	AS	7200	ug/L
BG-01	6/16/2010 10:48	FG	120	ug/L
BG-01	7/3/2010 1:45	AS	729	ug/L
BG-01	8/10/2010 18:45	AS	260	ug/L
BG-01	8/22/2010 21:00	AS	590	ug/L
BG-01	9/8/2010 20:15	AS	750	ug/L
BG-01	12/8/2010 17:10	FG	284	ug/L
BG-01	1/7/2011 17:10	FG	161	ug/L
BG-01	1/14/2011 17:30	FG	223	ug/L
BG-01	1/17/2011 18:20	FG	88.1	ug/L
BG-01	2/12/2011 17:30	FG	129	ug/L
BG-01	2/15/2011 18:10	FG	95.3	ug/L
BG-01	3/1/2011 17:58	FG	52.5	ug/L
BG-01	3/3/2011 17:12	FG	120	ug/L
BG-01	4/13/2011 19:00	AS	610	ug/L
BG-01	5/8/2011 18:45	AS	1400	ug/L

FLUSH DATA (AS, FG, IS1, IS2)

Total Copper - BG Outlet	
Effectiveness (2008-2009 vs. 2010/2011):	**-8% Gain**
Effectiveness (2008-2009 vs. 2011/2012):	**-83% Gain**
Effectiveness (2008-2009 vs. 2012/2013):	**-23% Gain**
Effectiveness (2008-2009 vs. 2013/2014):	**40% Reduction**

BG-01	5/22/2011 21:45	AS	730	ug/L
BG-01	5/23/2011 21:30	AS	1500	ug/L
BG-01	6/2/2011 3:00	AS	760	ug/L
BG-01	6/2/2011 15:00	AS	280	ug/L
BG-01	6/7/2011 2:00	AS	1200	ug/L
BG-01	6/8/2011 18:45	AS	1100	ug/L
BG-01	6/9/2011 10:30	FG	86	ug/L
BG-01	7/14/2011 7:45	AS	2000	ug/L
BG-01	8/5/2011 9:00	AS	1200	ug/L
BG-01	3/21/2012 13:45	AS	500	ug/L
BG-01	4/1/2012 1:00	AS	2700	ug/L
BG-01	4/26/2012 19:00	AS	100	ug/L
BG-01	6/5/2012 18:30	AS	1700	ug/L
BG-01	6/13/2012 2:30	AS	730	ug/L
BG-01	7/7/2012 17:30	AS	220	ug/L
BG-01	7/14/2012 21:00	AS	1400	ug/L
BG-01	7/16/2012 14:30	AS	1700	ug/L
BG-01	10/19/2012 8:23	AS	16400	ug/L
BG-01	11/26/2012 11:03	AS	1400	ug/L
BG-01	5/16/2013 16:00	AS	810	ug/L
BG-CLV-1	5/22/2013 21:29	IS1	680	ug/L
BG-01	5/22/2013 21:30	AS	1200	ug/L
BG-01	5/23/2013 19:00	AS	110	ug/L
BG-01	5/26/2013 19:30	AS	570	ug/L
BG-01	5/30/2013 0:30	AS	81	ug/L
BG-01	6/2/2013 19:45	AS	250	ug/L
BG-CLV-1	6/11/2013 15:00	IS1	1200	ug/L
BG-CLV-1	6/11/2013 15:15	IS2	940	ug/L
BG-01	6/19/2013 18:00	AS	960	ug/L
BG-01	6/24/2013 22:45	AS	120	ug/L
BG-CLV-1	6/29/2013 15:35	IS1	420	ug/L
BG-CLV-1	6/29/2013 15:50	IS2	320	ug/L
BG-CLV-1	7/5/2013 16:47	IS1	1100	ug/L
BG-CLV-1	7/5/2013 17:02	IS2	780	ug/L
BG-CLV-1	7/16/2013 22:26	IS1	260	ug/L
BG-CLV-1	7/16/2013 22:41	IS2	380	ug/L
BG-CLV-1	8/1/2013 16:04	IS1	560	ug/L
BG-CLV-1	8/1/2013 16:19	IS2	1100	ug/L
BG-CLV-1	8/22/2013 15:55	IS1	550	ug/L
BG-CLV-1	8/22/2013 16:10	IS2	660	ug/L
BG-CLV-1	8/26/2013 18:16	IS1	450	ug/L
BG-CLV-1	8/26/2013 18:31	IS2	310	ug/L
BG-CLV-1	8/28/2013 13:55	IS1	160	ug/L
BG-CLV-1	8/28/2013 14:10	IS2	120	ug/L
BG-CLV-1	9/3/2013 19:23	IS1	70	ug/L
BG-CLV-1	9/3/2013 19:38	IS2	120	ug/L
BG-CLV-1	9/7/2013 16:39	IS1	220	ug/L
BG-CLV-1	9/7/2013 16:54	IS2	320	ug/L
BG-CLV-1	9/13/2013 15:55	IS1	700	ug/L
BG-CLV-1	9/13/2013 16:10	IS2	710	ug/L
BG-CLV-1	9/17/2013 11:34	IS1	130	ug/L
BG-CLV-1	9/17/2013 11:49	IS2	140	ug/L
BG-CLV-1	9/24/2013 13:28	IS1	80	ug/L
BG-CLV-1	9/24/2013 13:43	IS2	110	ug/L
BG-CLV-1	9/25/2013 12:22	IS1	76	ug/L
BG-CLV-1	9/25/2013 12:37	IS2	110	ug/L
BG-01	3/7/14 4:00 PM	AS	740	ug/L
BG-CLV-1	4/18/14 1:49 AM	IS1	1100	ug/L
BG-CLV-1	4/18/14 2:04 AM	IS2	690	ug/L
BG-01	4/22/14 2:35 PM	AS	1700	ug/L
BG-CLV-1	4/25/14 5:26 PM	IS1	200	ug/L
BG-CLV-1	4/25/14 5:41 PM	IS2	300	ug/L
BG-CLV-1	5/18/14 1:54 PM	IS1	54	ug/L
BG-CLV-1	5/18/14 2:09 PM	IS2	67	ug/L
BG-CLV-1	6/13/14 5:14 AM	IS1	910	ug/L
BG-CLV-1	6/13/14 5:29 AM	IS2	530	ug/L
BG-CLV-1	6/13/14 9:04 PM	IS1	130	ug/L
BG-CLV-1	6/13/14 9:19 PM	IS2	140	ug/L
BG-CLV-1	6/17/14 8:14 PM	IS1	50	ug/L

BG-CLV-1	6/17/14 8:29 PM	IS2	51	ug/L
BG-CLV-1	6/20/14 11:45 AM	IS1	230	ug/L
BG-CLV-1	6/20/14 12:00 PM	IS2	290	ug/L
BG-CLV-1	6/24/14 4:22 PM	IS1	420	ug/L
BG-CLV-1	6/24/14 4:37 PM	IS2	230	ug/L
BG-CLV-1	6/25/14 3:38 PM	IS1	530	ug/L
BG-CLV-1	6/25/14 3:53 PM	IS2	470	ug/L

ALL DATA

SAMPLE_DEL_GROUP	SAMPLE_DATE	SAMPLE_TYPE_CODE	COPPER_TR	UNIT
WA-SD	5/20/2008 22:00	AS	1810	ug/L
WA-SD	5/28/2008 17:45	AS	6680	ug/L
WA-SD	6/4/2008 8:00	AS	1590	ug/L
WA-SD	7/4/2008 16:15	AS	6900	ug/L
WA-SD	7/22/2008 14:30	AS	4500	ug/L
WA-SD	2/25/2009 15:30	FG	121	ug/L
WA-SD	3/7/09 16:25	FG	59	ug/L
WA-SD	3/17/09 16:07	FG	947	ug/L
WA-SD	3/21/09 19:23	FG	1190	ug/L
WA-SD	5/3/2009 22:30	AS	1300	ug/L
WA-SD	5/12/2009 9:00	AS	1700	ug/L
WA-SD	5/24/2009	FG	290	ug/L
WA-SD	6/1/2009	FG	319	ug/L
WA-SD	6/5/2009 18:30	AS	1300	ug/L
WA-SD	6/15/2009 14:15	AS	14	ug/L
WA-SD	6/20/2009 15:00	AS	430	ug/L
WA-SD	7/12/2009 14:30	AS	1000	ug/L
WA-SD	7/26/2009 14:45	AS	4800	ug/L
WA-SD	8/6/2009 15:00	AS	8900	ug/L
WA-SD	8/7/2009 16:15	AS	420	ug/L
WA-SD	8/30/2009 23:30	AS	2300	ug/L
WA-SD	9/30/2009 1:45	AS	780	ug/L
WA-SD	5/18/2010 14:30	AS	1200	ug/L
WA-SD	5/24/2010 11:00	AS	350	ug/L
WA-SD	5/28/2010 9:00	AS	760	ug/L
WA-SD	6/11/2010 0:00	AS	560	ug/L
WA-SD	6/15/2010 13:45	AS	6600	ug/L
WA-SD	6/16/2010 10:05	FG	12800	ug/L
WA-SD	7/3/2010 1:45	AS	598	ug/L
WA-SD	8/10/2010 18:45	AS	356	ug/L
WA-SD	8/22/2010 21:15	AS	430	ug/L
WA-SD	9/8/2010 20:00	AS	1400	ug/L
WA-SD	3/10/2011 15:00	AS	1100	ug/L
WA-SD	5/8/2011 18:30	AS	280	ug/L
WA-SD	5/22/2011 21:30	AS	450	ug/L
WA-SD	5/23/2011 21:30	AS	1900	ug/L
WA-SD	6/2/2011 3:15	AS	1600	ug/L
WA-SD	6/2/2011 13:00	AS	1200	ug/L
WA-SD	6/7/2011 0:30	AS	1300	ug/L
WA-SD	6/8/2011 18:30	AS	2700	ug/L
WA-SD	7/14/2011 7:30	AS	4000	ug/L
WA-SD	8/5/2011 8:30	AS	230	ug/L
WA-SD	3/21/2012 13:30	AS	2500	ug/L
WA-SD	4/1/2012 1:00	AS	2200	ug/L
WA-SD	4/26/2012 18:30	AS	630	ug/L
WA-SD	6/5/2012 18:30	AS	6300	ug/L
WA-SD	6/13/2012 2:30	AS	540	ug/L
WA-SD	7/7/2012 17:00	AS	3400	ug/L
WA-SD	7/14/2012 21:00	AS	1100	ug/L
WA-SD	7/16/2012 14:30	AS	880	ug/L
WA-SD	10/19/2012 7:58	AS	800	ug/L
WA-SD	11/26/2012 11:12	AS	1100	ug/L
WA-SD	5/16/2013 16:00	AS	600	ug/L
WA-SD	5/22/2013 21:30	AS	1100	ug/L
WA-SD	5/23/2013 19:15	AS	300	ug/L
WA-SD	5/26/2013 19:30	AS	790	ug/L
WA-SD	5/30/2013 0:15	AS	230	ug/L
WA-SD	6/2/2013 14:15	AS	500	ug/L
WA-SD	6/11/2013 15:00	AS	4900	ug/L
WA-SD	6/19/2013 18:15	AS	2600	ug/L
WA-SD	6/24/2013 23:00	AS	210	ug/L
WA-SD	6/29/2013 15:30	AS	1700	ug/L
WA-SD	7/5/2013 13:00	AS	180	ug/L
WA-SD	7/16/2013 13:00	AS	410	ug/L
WA-SD	8/1/2013 16:15	AS	12200	ug/L
WA-SD	8/26/2013 18:30	AS	4600	ug/L
WA-SD	8/28/2013 14:15	AS	360	ug/L

ALL DATA

Total Copper - WA Outlet	
Effectiveness (2008-2009 vs. 2010/2011):	**8% Reduction**
Effectiveness (2008-2009 vs. 2011/2012):	**21% Reduction**
Effectiveness (2008-2009 vs. 2012/2013):	**11% Reduction**
Effectiveness (2008-2009 vs. 2013/2014):	**18% Reduction**

*** Through June 2014

WA-SD	9/7/2013 17:00	AS	1700	ug/L
WA-SD	9/13/2013 16:00	AS	3300	ug/L
WA-SD	9/17/2013 12:15	AS	1100	ug/L
WA-SD	9/24/2013 13:45	AS	1000	ug/L
WA-SD	9/25/2013 12:30	AS	190	ug/L
WA-SD	4/18/14 2:00 AM	AS	540	ug/L
WA-SD	4/22/14 3:00 PM	AS	720	ug/L
WA-SD	4/25/14 5:30 PM	AS	2500	ug/L
WA-SD	6/13/14 8:45 PM	AS	860	ug/L
WA-SD	6/15/14 8:40 PM	AS	280	ug/L
WA-SD	6/16/14 12:31 PM	AS	2000	ug/L
WA-SD	6/20/14 11:00 PM	AS	820	ug/L
WA-SD	6/26/14 12:15 AM	AS	4000	ug/L

ALL DATA

SAMPLE_DEL_GROUP	SAMPLE_DATE	SAMPLE_TYPE_CODE	COPPER_TR	UNIT
WSD	5/20/2008 22:00	AS	817	ug/L
WSD	5/28/2008 17:45	AS	4820	ug/L
WSD	6/4/2008 8:00	AS	784	ug/L
WSD	7/4/2008 16:15	AS	1500	ug/L
WSD	7/22/2008 14:30	AS	4200	ug/L
WSD	5/3/2009 23:00	AS	460	ug/L
WSD	5/12/2009 9:00	AS	490	ug/L
WSD	6/5/2009 16:30	AS	1100	ug/L
WSD	6/20/2009 15:00	AS	130	ug/L
WSD	7/12/2009 14:00	AS	1100	ug/L
WSD	7/24/2009 16:15	AS	6600	ug/L
WSD	8/6/2009 15:00	AS	2900	ug/L
WSD	8/7/2009 17:15	AS	410	ug/L
WSD	8/30/2009 23:15	AS	15100	ug/L
WSD	9/30/2009 0:15	AS	17600	ug/L
WSD	5/18/2010 14:30	AS	1100	ug/L
WSD	5/28/2010 9:00	AS	360	ug/L
WSD	6/10/2010 22:30	AS	49	ug/L
WSD	6/15/2010 13:45	AS	240	ug/L
WSD	6/16/2010 11:28	FG	210	ug/L
WSD	7/3/2010 1:30	AS	3200	ug/L
WSD	8/10/2010 18:45	AS	1030	ug/L
WSD	8/22/2010 21:00	AS	2700	ug/L
WSD	9/8/2010 20:00	AS	3000	ug/L
WSD	5/8/2011 18:45	AS	6900	ug/L
WSD	5/22/2011 21:45	AS	2300	ug/L
WSD	5/23/2011 21:45	AS	170	ug/L
WSD	6/2/2011 3:45	AS	620	ug/L
WSD	6/7/2011 1:45	AS	110	ug/L
WSD	6/8/2011 19:30	AS	80	ug/L
WSD	7/14/2011 7:00	AS	24300	ug/L
WSD	4/1/2012 1:15	AS	530	ug/L
WSD	6/5/2012 18:30	AS	2000	ug/L
WSD	6/13/2012 1:15	AS	170	ug/L
WSD	7/14/2012 21:00	AS	260	ug/L
WSD	7/16/2012 14:45	AS	1500	ug/L
WSD	5/30/2013 0:30	AS	120	ug/L
WSD	8/1/2013 16:15	AS	6200	ug/L
WSD	9/13/2013 16:00	AS	16200	ug/L
WSD	9/18/2013 7:00	AS	300	ug/L
WSD	9/24/2013 14:50	AS	370	ug/L
WSD	9/25/2013 19:00	AS	130	ug/L
WSD	4/18/14 1:55 AM	AS	4000	ug/L
WSD	4/22/14 2:35 PM	AS	4700	ug/L
WSD	6/20/14 4:30 PM	AS	1600	ug/L

ALL DATA

Total Copper - WSD	
Effectiveness (2008-2009 vs. 2010/2011):	**25% Reduction**
Effectiveness (2008-2009 vs. 2011/2012):	**16% Reduction**
Effectiveness (2008-2009 vs. 2012/2013):	**35% Reduction**
Effectiveness (2008-2009 vs. 2013/2014):	**3% Reduction**

*** Through June 2014

ALL DATA

SAMPLE_DEL_GROUP	SAMPLE_DATE	SAMPLE_TYPE_CODE	COPPER_TR	UNIT
BG-HD-IN	5/16/2013 10:15	IS2	1400	ug/L
BG-HD-IN	5/16/2013 16:04	IS3	867	ug/L
BG-HD-IN	5/22/2013 23:31	IS4	1450	ug/L
BG-HD-IN	5/22/2013 23:33	IS5	831	ug/L
BG-HD-IN	5/22/2013 23:35	IS6	528	ug/L
BG-HD-IN	5/22/2013 23:36	IS7	656	ug/L
BG-HD-IN	5/22/2013 23:38	IS8	425	ug/L
BG-HD-IN	5/23/2013 21:01	IS1	415	ug/L
BG-HD-IN	5/23/2013 21:16	IS2	157	ug/L
BG-HD-IN	5/23/2013 21:31	IS3	131	ug/L
BG-HD-IN	5/23/2013 21:46	IS4	124	ug/L
BG-HD-IN	5/23/2013 22:01	IS5	123	ug/L
BG-HD-IN	5/23/2013 22:31	IS6	75	ug/L
BG-HD-IN	5/23/2013 23:01	IS7	67	ug/L
BG-HD-IN	5/23/2013 23:31	IS8	62.2	ug/L
BG-HD-IN	5/29/2013 22:13	IS1	177	ug/L
BG-HD-IN	5/29/2013 22:15	IS2	192	ug/L
BG-HD-IN	5/29/2013 22:43	IS3	154	ug/L
BG-HD-IN	5/29/2013 22:58	IS4	112	ug/L
BG-HD-IN	5/29/2013 23:13	IS5	92.1	ug/L
BG-HD-IN	5/29/2013 23:14	IS6	84.5	ug/L
BG-HD-IN	6/2/2013 13:56	IS1	597	ug/L
BG-HD-IN	6/2/2013 14:11	IS2	320	ug/L
BG-HD-IN	6/2/2013 14:26	IS3	728	ug/L
BG-HD-IN	6/2/2013 14:41	IS4	115	ug/L
BG-HD-IN	6/11/2013 14:52	IS1	1500	ug/L
BG-HD-IN	6/11/2013 15:07	IS2	770	ug/L
BG-HD-IN	6/11/2013 15:22	IS3	710	ug/L
BG-HD-IN	6/11/2013 19:17	IS4	290	ug/L
BG-HD-IN	6/11/2013 19:32	IS5	280	ug/L
BG-HD-IN	6/11/2013 19:38	IS6	120	ug/L
BG-HD-IN	6/11/2013 19:39	IS7	510	ug/L
BG-HD-IN	6/19/2013 16:06	IS1	612	ug/L
BG-HD-IN	6/19/2013 16:21	IS2	683	ug/L
BG-HD-IN	6/19/2013 17:57	IS3	550	ug/L
BG-HD-IN	6/19/2013 18:12	IS4	86.2	ug/L
BG-HD-IN	6/19/2013 18:27	IS5	225	ug/L
BG-HD-IN	6/19/2013 21:03	IS6	195	ug/L
BG-HD-IN	6/19/2013 21:18	IS7	208	ug/L
BG-HD-IN	6/19/2013 21:28	IS8	125	ug/L
BG-HD-IN	6/29/2013 15:33	IS1	384	ug/L
BG-HD-IN	7/5/2013 16:46	IS1	1010	ug/L
BG-HD-IN	7/5/2013 17:01	IS2	758	ug/L
BG-HD-IN	7/16/2013 22:39	IS2	382	ug/L
BG-HD-IN	7/16/2013 22:54	IS3	303	ug/L
BG-HD-IN	7/17/2013 0:24	IS7	203	ug/L
BG-HD-IN	8/22/2013 15:53	IS1	647	ug/L
BG-HD-IN	8/26/2013 18:15	IS1	815	ug/L
BG-HD-IN	8/26/2013 18:30	IS2	576	ug/L
BG-HD-IN	8/26/2013 18:45	IS3	227	ug/L
BG-HD-IN	8/28/2013 13:55	IS1	330	ug/L
BG-HD-IN	9/3/2013 19:11	IS1	243	ug/L
BG-HD-IN	9/13/2013 15:58	IS2	929	ug/L
BG-HD-IN	9/13/2013 16:05	IS3	771	ug/L
BG-HD-IN	9/13/2013 16:16	IS4	656	ug/L
BG-HD-IN	9/13/2013 16:35	IS5	554	ug/L
BG-HD-IN	9/13/2013 16:41	IS6	535	ug/L
BG-HD-IN	9/13/2013 16:45	IS7	689	ug/L
BG-HD-IN	9/13/2013 16:49	IS8	341	ug/L
BG-HD-IN	9/17/2013 11:35	IS1	217	ug/L
BG-HD-IN	9/22/2013 19:25	IS3	252	ug/L
BG-HD-IN	9/22/2013 19:33	IS4	138	ug/L
BG-HD-IN	9/25/2013 12:27	IS1	144	ug/L
BG-HD-IN	9/25/2013 12:42	IS2	115	ug/L
BG-HD-OUT	5/16/2013 16:06	IS3	798	ug/L
BG-HD-OUT	5/22/2013 21:22	IS1	530	ug/L
BG-HD-OUT	5/22/2013 21:28	IS2	779	ug/L

ALL DATA

Buffalo Gulch	
HD Effectiveness:	**37% Reduction**

BG-HD-OUT	5/22/2013 21:30	IS3	770	ug/L
BG-HD-OUT	5/22/2013 21:33	IS4	470	ug/L
BG-HD-OUT	5/22/2013 21:48	IS5	198	ug/L
BG-HD-OUT	5/22/2013 22:03	IS6	145	ug/L
BG-HD-OUT	5/22/2013 22:04	IS7	175	ug/L
BG-HD-OUT	5/22/2013 22:06	IS8	156	ug/L
BG-HD-OUT	6/2/2013 14:18	IS1	177	ug/L
BG-HD-OUT	6/2/2013 14:33	IS2	142	ug/L
BG-HD-OUT	6/2/2013 14:48	IS3	140	ug/L
BG-HD-OUT	6/2/2013 15:03	IS4	123	ug/L
BG-HD-OUT	6/2/2013 16:48	IS8	125	ug/L
BG-HD-OUT	6/11/2013 14:52	IS1	650	ug/L
BG-HD-OUT	6/11/2013 15:07	IS2	550	ug/L
BG-HD-OUT	6/11/2013 15:22	IS3	410	ug/L
BG-HD-OUT	6/11/2013 19:16	IS4	190	ug/L
BG-HD-OUT	6/24/2013 22:32	IS1	124	ug/L
BG-HD-OUT	6/24/2013 22:47	IS2	124	ug/L
BG-HD-OUT	6/24/2013 23:02	IS3	83.5	ug/L
BG-HD-OUT	6/24/2013 23:17	IS4	64	ug/L
BG-HD-OUT	6/29/2013 15:33	IS1	219	ug/L
BG-HD-OUT	6/29/2013 15:48	IS2	341	ug/L
BG-HD-OUT	7/5/2013 16:47	IS1	1100	ug/L
BG-HD-OUT	7/5/2013 16:49	IS2	1100	ug/L
BG-HD-OUT	7/5/2013 17:04	IS3	588	ug/L
BG-HD-OUT	7/16/2013 22:24	IS1	230	ug/L
BG-HD-OUT	7/16/2013 22:39	IS2	434	ug/L
BG-HD-OUT	7/16/2013 22:54	IS3	246	ug/L
BG-HD-OUT	7/16/2013 23:09	IS4	157	ug/L
BG-HD-OUT	7/16/2013 23:24	IS5	131	ug/L
BG-HD-OUT	7/16/2013 23:54	IS6	106	ug/L
BG-HD-OUT	7/17/2013 0:24	IS7	133	ug/L
BG-HD-OUT	8/22/2013 15:54	IS1	470	ug/L
BG-HD-OUT	8/22/2013 16:24	IS2	453	ug/L
BG-HD-OUT	8/26/2013 18:15	IS1	355	ug/L
BG-HD-OUT	8/26/2013 18:30	IS2	292	ug/L
BG-HD-OUT	8/28/2013 13:56	IS1	239	ug/L
BG-HD-OUT	8/28/2013 14:11	IS2	138	ug/L
BG-HD-OUT	8/28/2013 14:26	IS3	119	ug/L
BG-HD-OUT	9/3/2013 19:11	IS1	48.7	ug/L
BG-HD-OUT	9/3/2013 19:21	IS2	79.5	ug/L
BG-HD-OUT	9/7/2013 16:40	IS1	224	ug/L
BG-HD-OUT	9/7/2013 16:55	IS2	312	ug/L
BG-HD-OUT	9/7/2013 17:10	IS3	225	ug/L
BG-HD-OUT	9/13/2013 15:54	IS1	521	ug/L
BG-HD-OUT	9/13/2013 16:09	IS2	948	ug/L
BG-HD-OUT	9/13/2013 16:24	IS3	584	ug/L
BG-HD-OUT	9/13/2013 16:54	IS4	369	ug/L
BG-HD-OUT	9/13/2013 17:27	IS6	460	ug/L
BG-HD-OUT	9/13/2013 17:35	IS7	698	ug/L
BG-HD-OUT	9/17/2013 11:36	IS1	95.1	ug/L
BG-HD-OUT	9/17/2013 11:51	IS2	133	ug/L
BG-HD-OUT	9/18/2013 12:59	IS1	87.9	ug/L
BG-HD-OUT	9/18/2013 13:14	IS2	135	ug/L
BG-HD-OUT	9/18/2013 13:21	IS3	151	ug/L
BG-HD-OUT	9/18/2013 13:36	IS4	150	ug/L
BG-HD-OUT	9/18/2013 13:39	IS5	157	ug/L
BG-HD-OUT	9/18/2013 13:41	IS6	132	ug/L
BG-HD-OUT	9/18/2013 13:54	IS7	121	ug/L
BG-HD-OUT	9/18/2013 14:01	IS8	1230	ug/L
BG-HD-OUT	9/24/2013 13:23	IS1	53.1	ug/L
BG-HD-OUT	9/24/2013 13:38	IS2	99.2	ug/L
BG-HD-OUT	9/24/2013 13:53	IS3	105	ug/L
BG-HD-OUT	9/24/2013 14:23	IS4	90.5	ug/L
BG-HD-OUT	9/24/2013 14:53	IS5	82.7	ug/L
BG-HD-OUT	9/24/2013 15:53	IS6	91.4	ug/L
BG-HD-OUT	9/25/2013 12:40	IS1	118	ug/L
BG-HD-OUT	9/25/2013 12:55	IS2	107	ug/L
BG-HD-OUT	9/25/2013 20:59	IS3	115	ug/L
BG-HD-OUT	9/25/2013 21:15	IS4	101	ug/L

BG-HD-OUT	9/25/2013 21:45	IS5	61.6	ug/L
BG-HD-OUT	9/25/2013 22:15	IS6	48.5	ug/L
BG-HD-OUT	9/26/2013 0:57	IS7	45.7	ug/L
BG-HD-OUT	9/26/2013 2:27	IS8	34.1	ug/L
BG-HD-OUT	9/29/2013 11:38	IS1	29.6	ug/L
BG-HD-OUT	9/29/2013 11:53	IS2	82.6	ug/L
BG-HD-OUT	9/29/2013 12:08	IS3	121	ug/L
BG-HD-OUT	9/29/2013 12:23	IS4	113	ug/L

ALL DATA

SAMPLE_DEL_GROUP	SAMPLE_DATE	SAMPLE_TYPE_CODE	COPPER_TR	UNIT
AR-HD-IN	5/16/2013 16:03	IS1	693	ug/L
AR-HD-IN	5/16/2013 16:18	IS2	1610	ug/L
AR-HD-IN	5/16/2013 16:33	IS3	758	ug/L
AR-HD-IN	5/16/2013 16:48	IS4	378	ug/L
AR-HD-IN	5/16/2013 17:03	IS5	272	ug/L
AR-HD-IN	5/16/2013 17:33	IS6	226	ug/L
AR-HD-IN	5/17/2013 12:58	IS7	277	ug/L
AR-HD-IN	5/17/2013 13:28	IS8	278	ug/L
AR-HD-IN	5/23/2013 21:03	IS1	146	ug/L
AR-HD-IN	5/23/2013 21:18	IS2	208	ug/L
AR-HD-IN	5/23/2013 21:33	IS3	286	ug/L
AR-HD-IN	5/23/2013 22:03	IS4	166	ug/L
AR-HD-IN	5/23/2013 22:33	IS5	142	ug/L
AR-HD-IN	5/23/2013 23:33	IS6	359	ug/L
AR-HD-IN	5/26/2013 14:18	IS1	858	ug/L
AR-HD-IN	5/26/2013 14:33	IS2	547	ug/L
AR-HD-IN	5/26/2013 14:48	IS3	349	ug/L
AR-HD-IN	5/26/2013 19:05	IS4	267	ug/L
AR-HD-IN	5/26/2013 19:35	IS5	203	ug/L
AR-HD-IN	5/26/2013 20:05	IS6	142	ug/L
AR-HD-IN	5/29/2013 23:51	IS1	94.9	ug/L
AR-HD-IN	5/30/2013 0:06	IS2	165	ug/L
AR-HD-IN	5/30/2013 0:21	IS3	123	ug/L
AR-HD-IN	5/30/2013 0:51	IS4	71.2	ug/L
AR-HD-IN	5/30/2013 1:21	IS5	54.5	ug/L
AR-HD-IN	6/2/2013 14:06	IS1	154	ug/L
AR-HD-IN	6/2/2013 14:21	IS2	283	ug/L
AR-HD-IN	6/2/2013 14:36	IS3	184	ug/L
AR-HD-IN	6/2/2013 15:06	IS4	111	ug/L
AR-HD-IN	6/2/2013 15:36	IS5	75	ug/L
AR-HD-IN	6/2/2013 16:36	IS6	89.2	ug/L
AR-HD-IN	6/19/2013 16:20	IS1	298	ug/L
AR-HD-IN	6/24/2013 22:38	IS1	138	ug/L
AR-HD-IN	6/24/2013 22:53	IS2	138	ug/L
AR-HD-IN	6/24/2013 23:08	IS3	74	ug/L
AR-HD-IN	6/24/2013 23:38	IS4	50.2	ug/L
AR-HD-IN	7/5/2013 16:51	IS1	813	ug/L
AR-HD-IN	7/5/2013 17:06	IS2	463	ug/L
AR-HD-IN	7/16/2013 22:28	IS1	338	ug/L
AR-HD-IN	7/16/2013 22:43	IS2	275	ug/L
AR-HD-IN	7/16/2013 22:58	IS3	144	ug/L
AR-HD-IN	7/16/2013 23:28	IS4	72.3	ug/L
AR-HD-IN	7/16/2013 23:58	IS5	59.7	ug/L
AR-HD-IN	7/17/2013 0:58	IS6	122	ug/L
AR-HD-IN	8/1/2013 16:03	IS1	1450	ug/L
AR-HD-IN	8/1/2013 16:07	IS2	1390	ug/L
AR-HD-IN	8/1/2013 16:20	IS3	937	ug/L
AR-HD-IN	8/22/2013 16:03	IS1	1170	ug/L
AR-HD-IN	8/26/2013 18:15	IS1	1150	ug/L
AR-HD-IN	8/26/2013 18:45	IS2	1220	ug/L
AR-HD-IN	8/26/2013 18:46	IS3	219	ug/L
AR-HD-IN	8/28/2013 13:51	IS1	108	ug/L
AR-HD-IN	8/28/2013 14:21	IS2	164	ug/L
AR-HD-IN	9/7/2013 16:39	IS1	959	ug/L
AR-HD-IN	9/7/2013 17:09	IS2	372	ug/L
AR-HD-IN	9/13/2013 15:54	IS1	1250	ug/L
AR-HD-IN	9/13/2013 18:37	IS2	1350	ug/L
AR-HD-IN	9/13/2013 20:08	IS3	735	ug/L
AR-HD-IN	9/13/2013 20:38	IS4	358	ug/L
AR-HD-IN	9/17/2013 11:39	IS1	111	ug/L
AR-HD-IN	9/17/2013 12:09	IS2	162	ug/L
AR-HD-IN	9/17/2013 12:39	IS3	97.5	ug/L
AR-HD-IN	9/17/2013 14:01	IS4	45.4	ug/L
AR-HD-IN	9/17/2013 14:02	IS5	29.5	ug/L
AR-HD-IN	9/24/2013 13:28	IS1	143	ug/L
AR-HD-IN	9/24/2013 13:58	IS2	145	ug/L
AR-HD-OUT	5/16/2013 16:07	IS1	230	ug/L

ALL DATA

Anaconda Road	
HD Effectiveness:	**32% Reduction**

AR-HD-OUT	5/16/2013 16:22	IS2	1040	ug/L
AR-HD-OUT	5/16/2013 16:37	IS3	742	ug/L
AR-HD-OUT	5/16/2013 16:52	IS4	477	ug/L
AR-HD-OUT	5/22/2013 4:31	IS4	193	ug/L
AR-HD-OUT	5/22/2013 4:46	IS5	138	ug/L
AR-HD-OUT	6/11/2013 14:53	IS1	740	ug/L
AR-HD-OUT	6/11/2013 15:08	IS2	770	ug/L
AR-HD-OUT	6/11/2013 15:23	IS3	420	ug/L
AR-HD-OUT	6/11/2013 19:14	IS5	230	ug/L
AR-HD-OUT	6/11/2013 19:29	IS6	220	ug/L
AR-HD-OUT	6/19/2013 16:14	IS1	45.5	ug/L
AR-HD-OUT	6/19/2013 16:29	IS2	103	ug/L
AR-HD-OUT	6/19/2013 17:53	IS3	147	ug/L
AR-HD-OUT	6/19/2013 18:08	IS4	162	ug/L
AR-HD-OUT	6/19/2013 18:23	IS5	141	ug/L
AR-HD-OUT	6/19/2013 18:38	IS6	171	ug/L
AR-HD-OUT	6/19/2013 21:02	IS7	212	ug/L
AR-HD-OUT	6/19/2013 21:32	IS8	226	ug/L
AR-HD-OUT	6/24/2013 22:37	IS2	114	ug/L
AR-HD-OUT	6/24/2013 22:52	IS3	124	ug/L
AR-HD-OUT	6/24/2013 23:07	IS4	83.1	ug/L
AR-HD-OUT	6/24/2013 23:22	IS5	60.9	ug/L
AR-HD-OUT	6/24/2013 23:37	IS6	64.9	ug/L
AR-HD-OUT	7/5/2013 16:57	IS1	434	ug/L
AR-HD-OUT	7/5/2013 17:12	IS2	465	ug/L
AR-HD-OUT	7/16/2013 22:24	IS1	77.8	ug/L
AR-HD-OUT	7/16/2013 22:39	IS2	332	ug/L
AR-HD-OUT	7/16/2013 22:54	IS3	197	ug/L
AR-HD-OUT	7/16/2013 22:54	IS3	191	ug/L
AR-HD-OUT	7/16/2013 23:09	IS4	131	ug/L
AR-HD-OUT	7/16/2013 23:24	IS5	98.4	ug/L
AR-HD-OUT	7/16/2013 23:54	IS6	88.9	ug/L
AR-HD-OUT	7/17/2013 0:24	IS7	111	ug/L
AR-HD-OUT	7/17/2013 0:54	IS8	172	ug/L
AR-HD-OUT	8/1/2013 16:04	IS1	1010	ug/L
AR-HD-OUT	8/1/2013 16:19	IS2	410	ug/L
AR-HD-OUT	8/1/2013 16:34	IS3	452	ug/L
AR-HD-OUT	8/1/2013 16:49	IS4	244	ug/L
AR-HD-OUT	8/1/2013 17:04	IS5	213	ug/L
AR-HD-OUT	8/2/2013 0:28	IS6	204	ug/L
AR-HD-OUT	8/2/2013 0:58	IS7	187	ug/L
AR-HD-OUT	8/2/2013 1:28	IS8	175	ug/L
AR-HD-OUT	8/22/2013 16:04	IS1	472	ug/L
AR-HD-OUT	8/22/2013 16:19	IS2	431	ug/L
AR-HD-OUT	8/26/2013 18:15	IS1	385	ug/L
AR-HD-OUT	8/26/2013 18:30	IS2	513	ug/L
AR-HD-OUT	8/26/2013 18:45	IS3	204	ug/L
AR-HD-OUT	8/26/2013 19:00	IS4	159	ug/L
AR-HD-OUT	8/28/2013 13:50	IS1	72.7	ug/L
AR-HD-OUT	8/28/2013 14:05	IS2	219	ug/L
AR-HD-OUT	8/28/2013 14:20	IS3	172	ug/L
AR-HD-OUT	8/28/2013 14:35	IS4	167	ug/L
AR-HD-OUT	9/7/2013 16:39	IS1	150	ug/L
AR-HD-OUT	9/7/2013 16:54	IS2	393	ug/L
AR-HD-OUT	9/7/2013 17:09	IS3	308	ug/L
AR-HD-OUT	9/13/2013 15:55	IS1	606	ug/L
AR-HD-OUT	9/13/2013 16:10	IS2	711	ug/L
AR-HD-OUT	9/13/2013 16:25	IS3	712	ug/L
AR-HD-OUT	9/13/2013 16:40	IS4	571	ug/L
AR-HD-OUT	9/13/2013 16:55	IS5	449	ug/L
AR-HD-OUT	9/13/2013 17:25	IS6	269	ug/L
AR-HD-OUT	9/13/2013 17:55	IS7	197	ug/L
AR-HD-OUT	9/13/2013 18:03	IS8	164	ug/L
AR-HD-OUT	9/17/2013 11:33	IS1	69.9	ug/L
AR-HD-OUT	9/17/2013 11:48	IS2	155	ug/L
AR-HD-OUT	9/17/2013 12:03	IS3	193	ug/L
AR-HD-OUT	9/17/2013 12:18	IS4	202	ug/L
AR-HD-OUT	9/17/2013 12:33	IS5	222	ug/L
AR-HD-OUT	9/17/2013 13:03	IS6	128	ug/L

AR-HD-OUT	9/17/2013 14:00	IS7	196	ug/L
AR-HD-OUT	9/17/2013 14:30	IS8	221	ug/L
AR-HD-OUT	9/25/2013 21:02	IS1	106	ug/L
AR-HD-OUT	9/25/2013 21:17	IS2	116	ug/L
AR-HD-OUT	9/25/2013 21:32	IS3	113	ug/L
AR-HD-OUT	9/25/2013 21:47	IS4	111	ug/L
AR-HD-OUT	9/25/2013 22:02	IS5	90.7	ug/L
AR-HD-OUT	9/25/2013 22:49	IS6	64.7	ug/L
AR-HD-OUT	9/25/2013 22:50	IS7	65.3	ug/L
AR-HD-OUT	9/25/2013 22:52	IS8	59.2	ug/L

APPENDIX E

Modeled Event Mean Concentration Probabilities for Contaminants of Concern

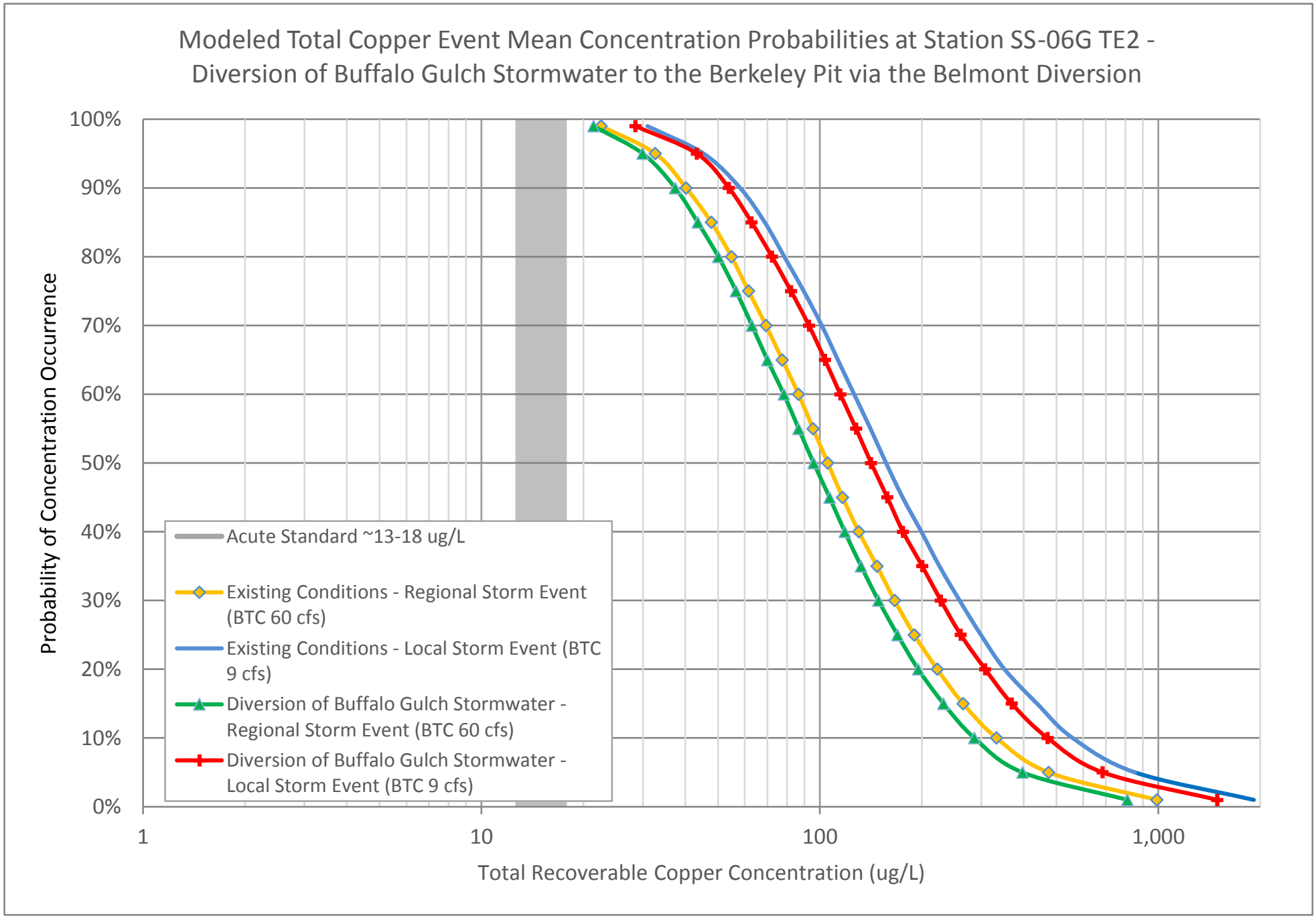


Figure E-1
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

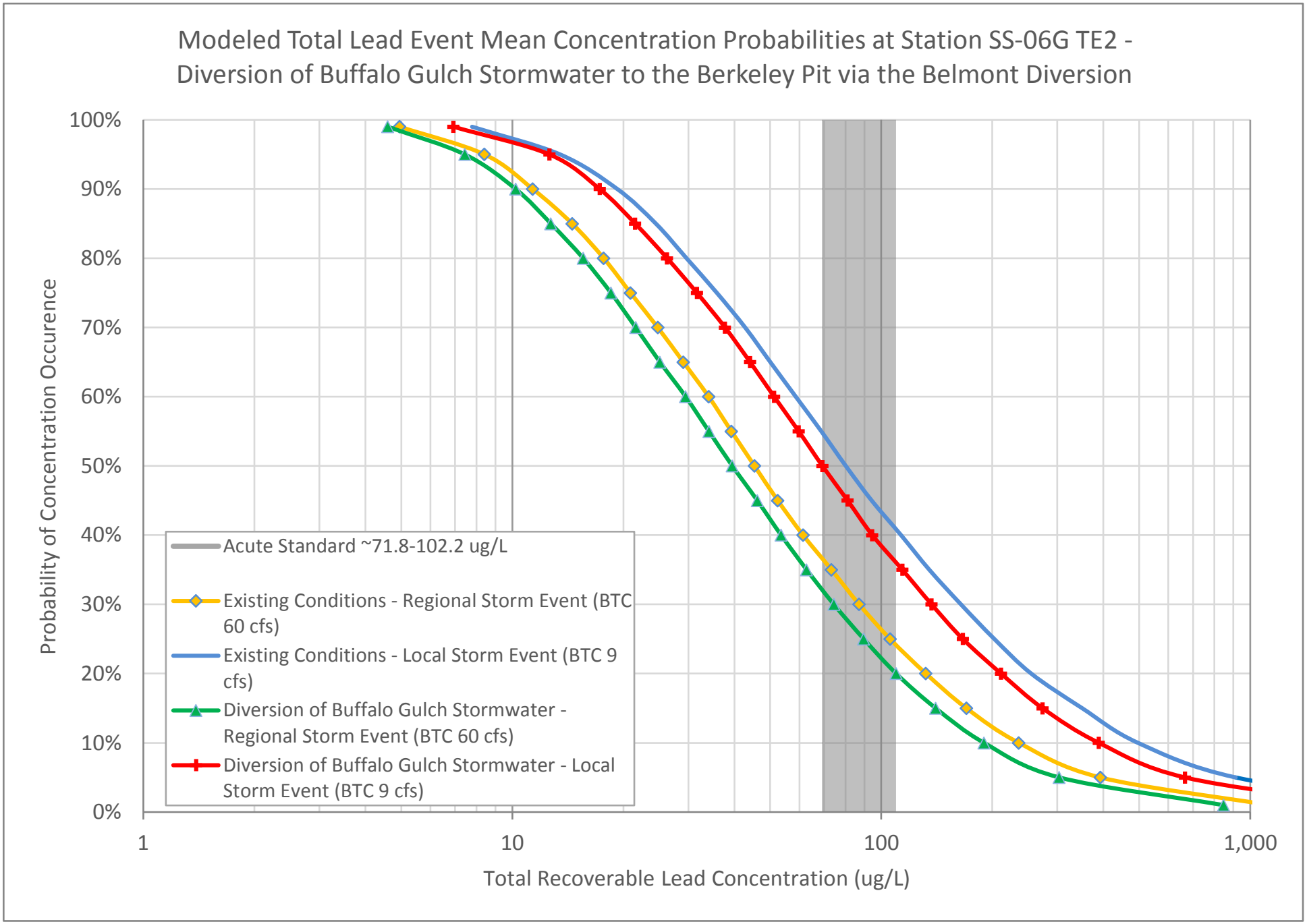


Figure E-2
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

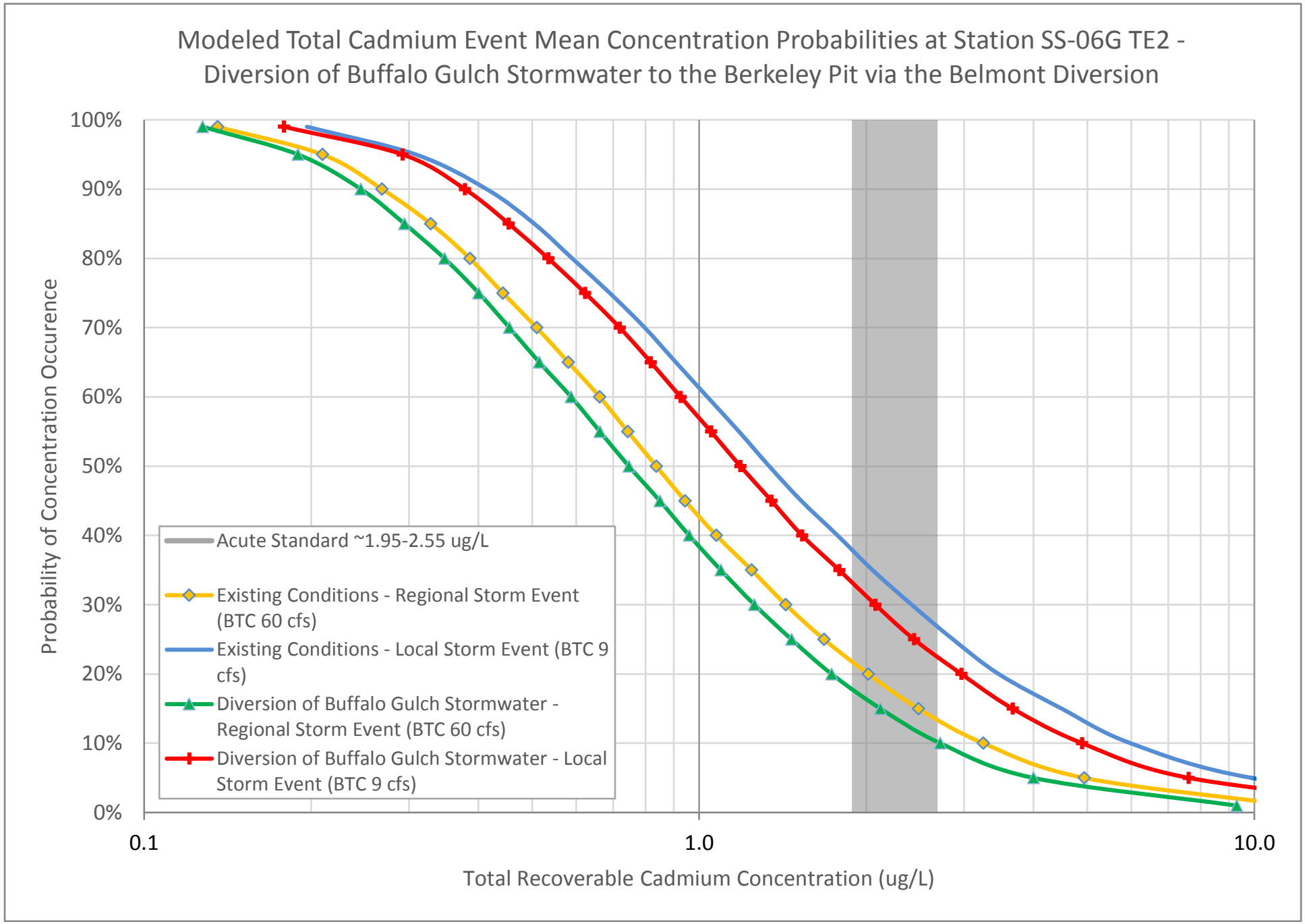


Figure E-3
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

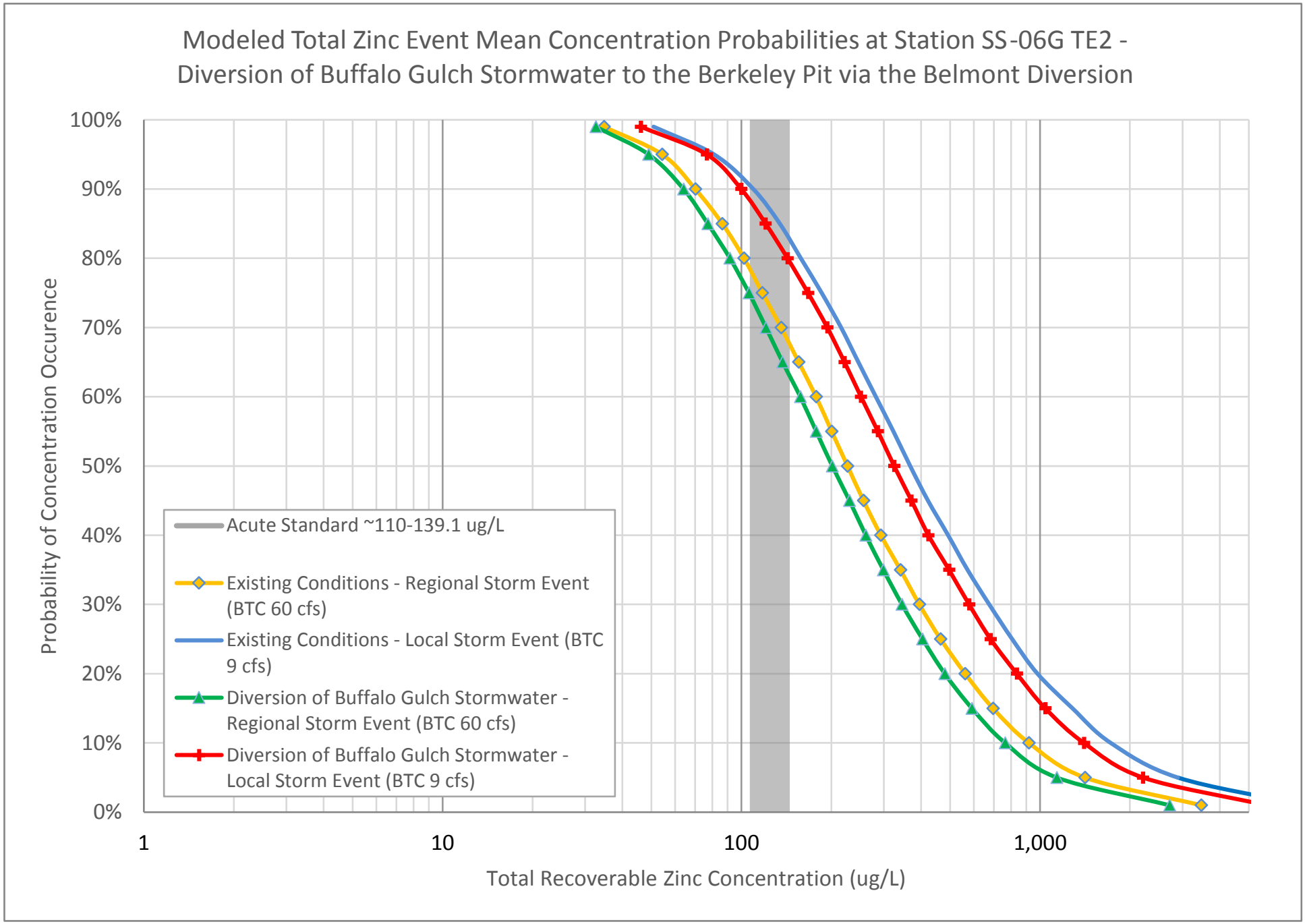


Figure E-4
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

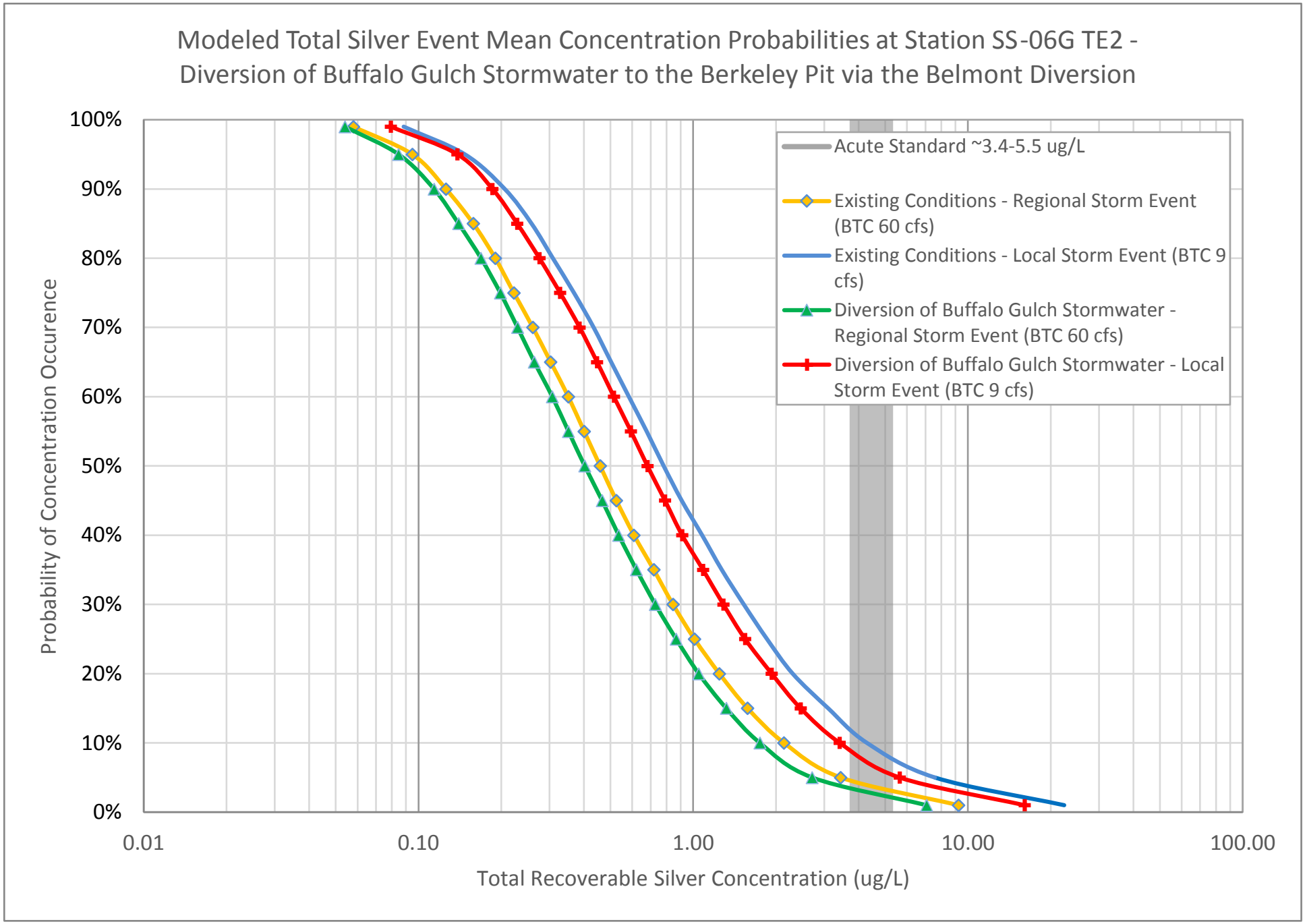


Figure E-5
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

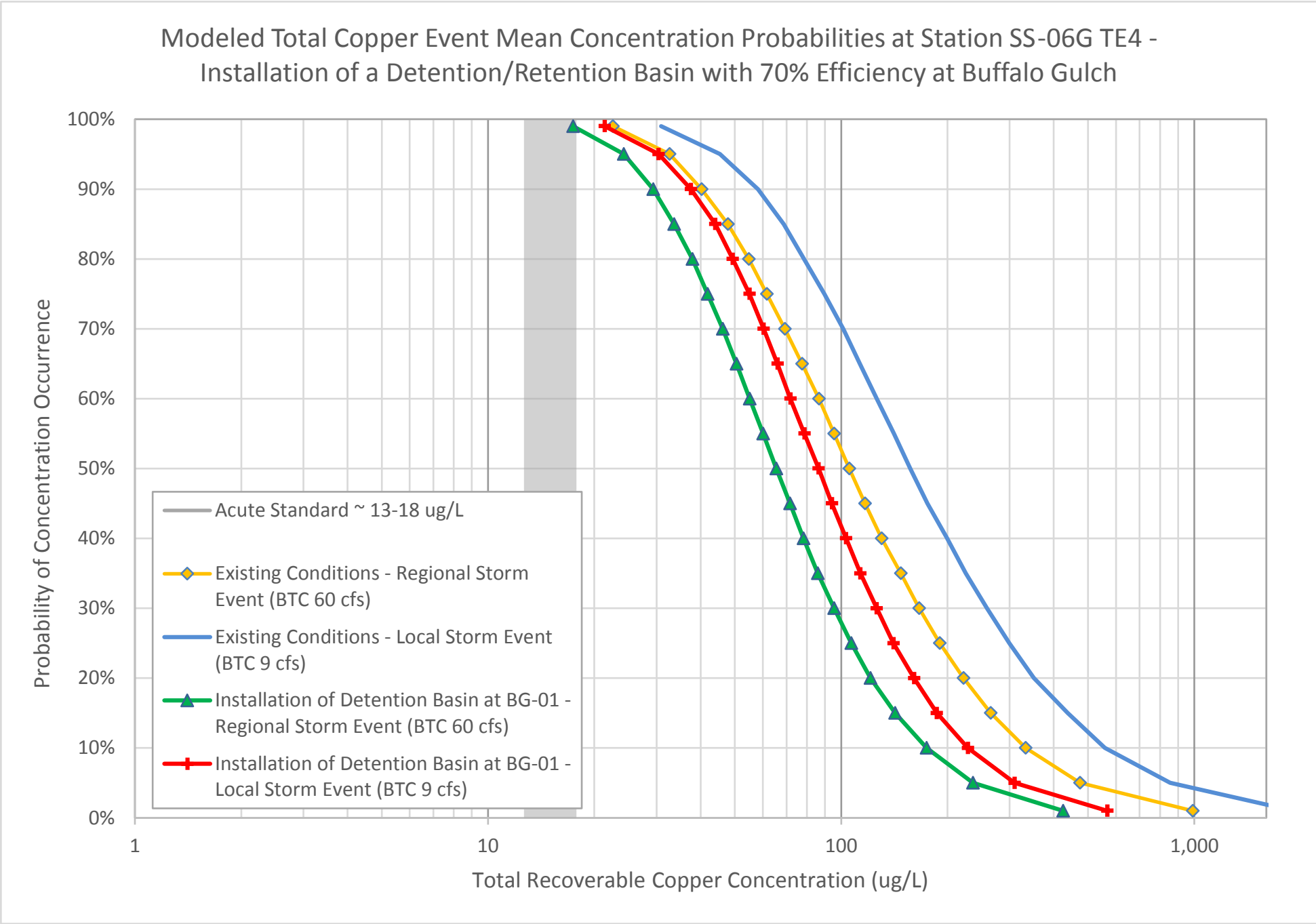


Figure E-6
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

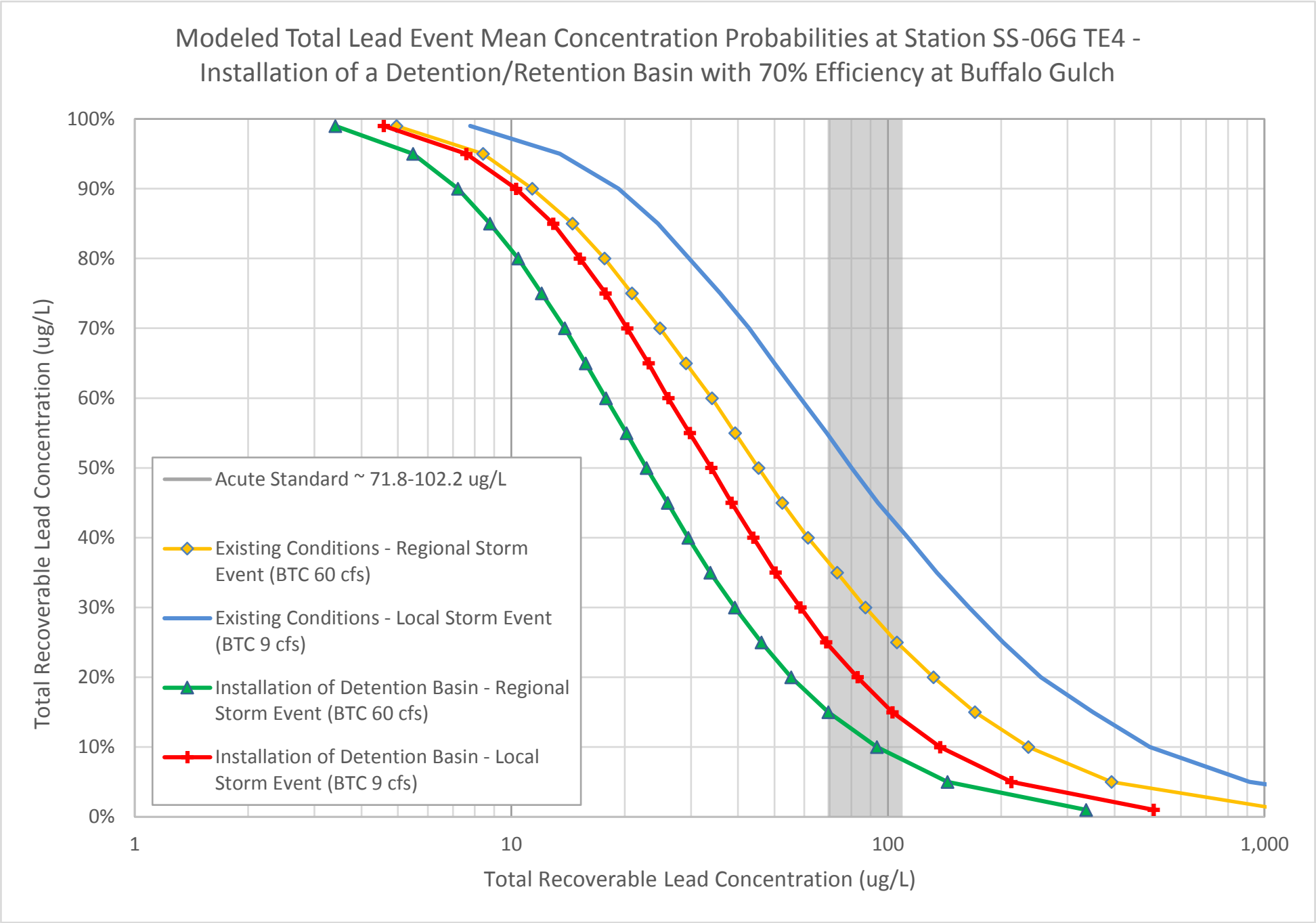


Figure E-7
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

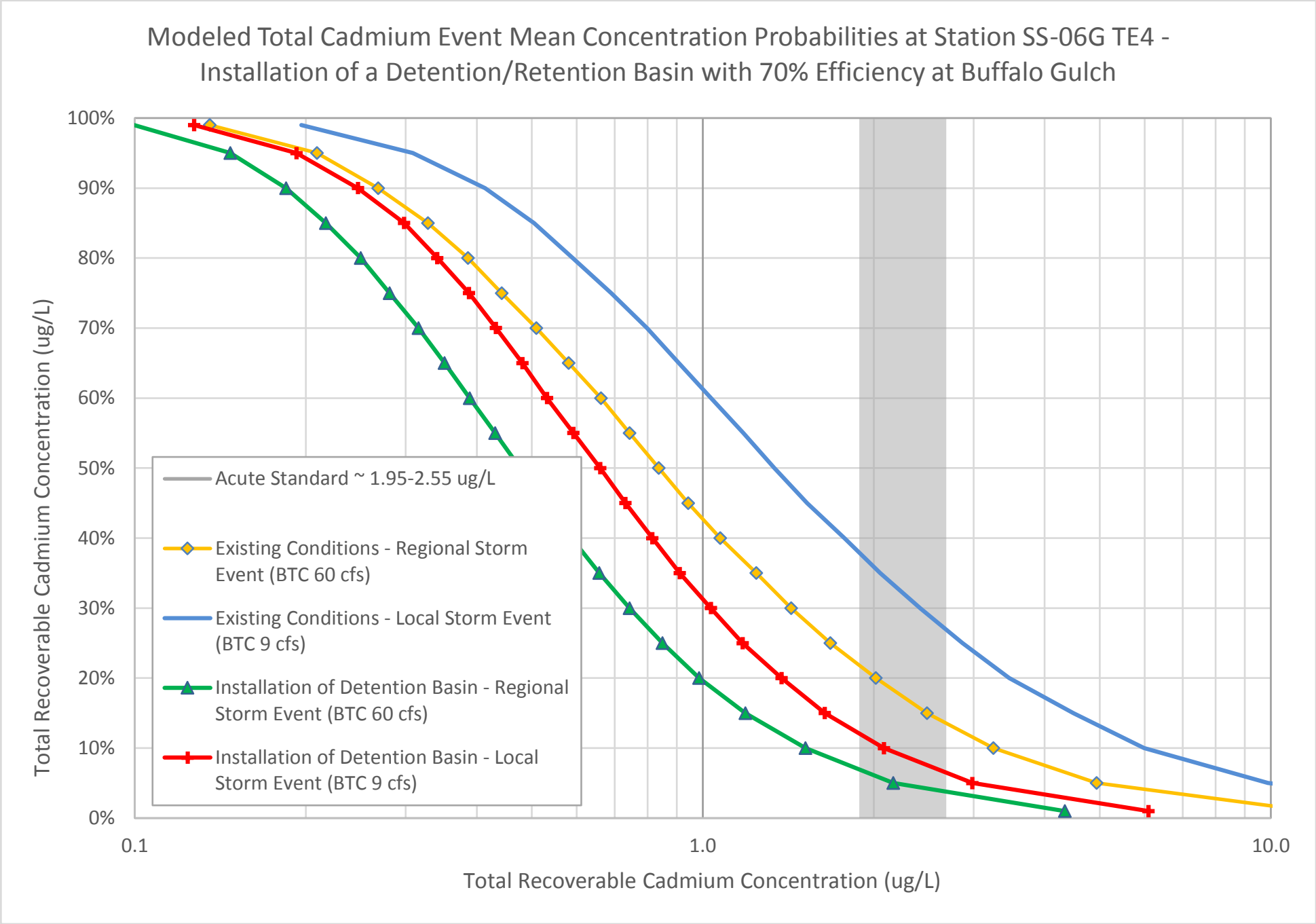


Figure E-8
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

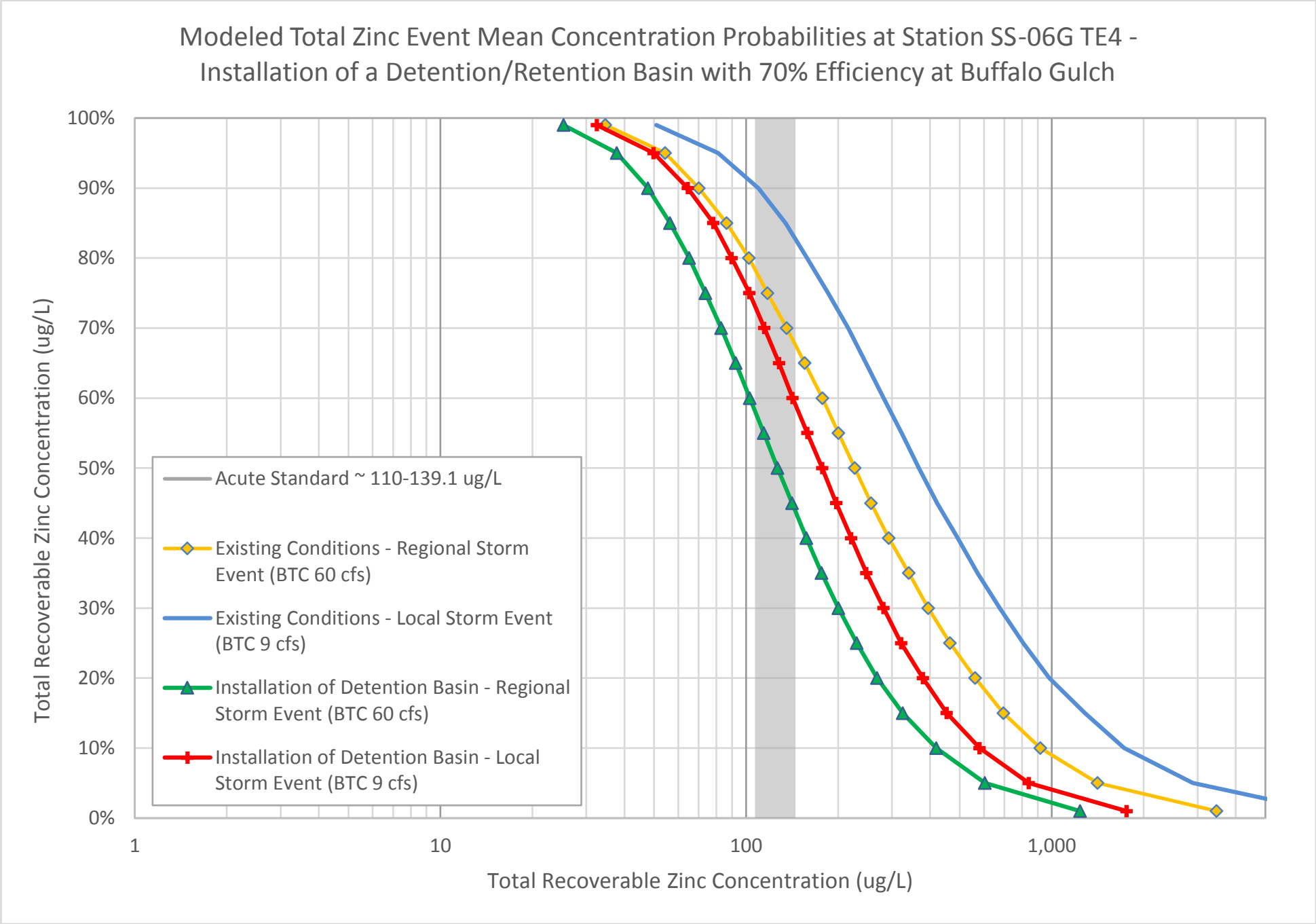


Figure E-9
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

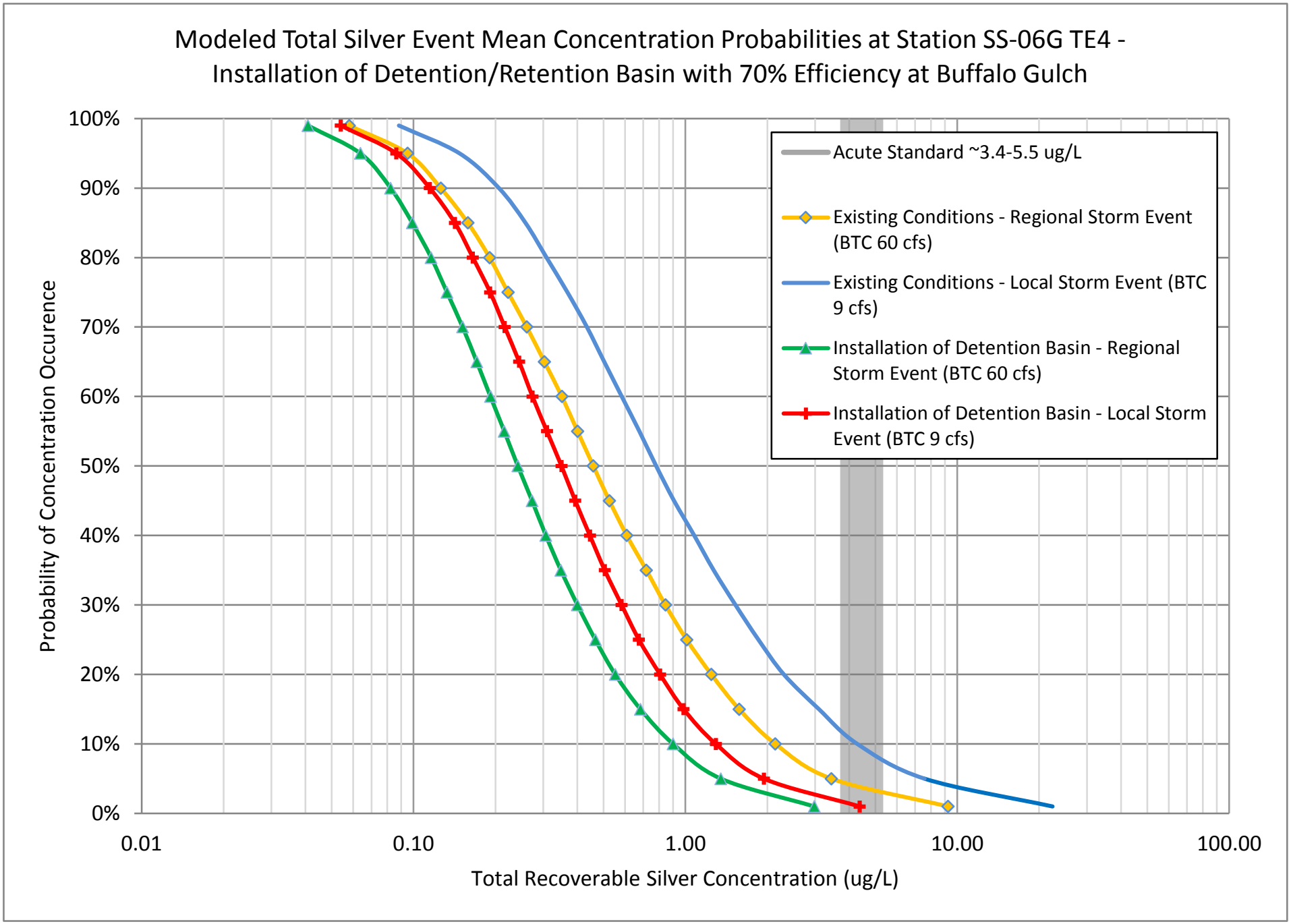


Figure E-10
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

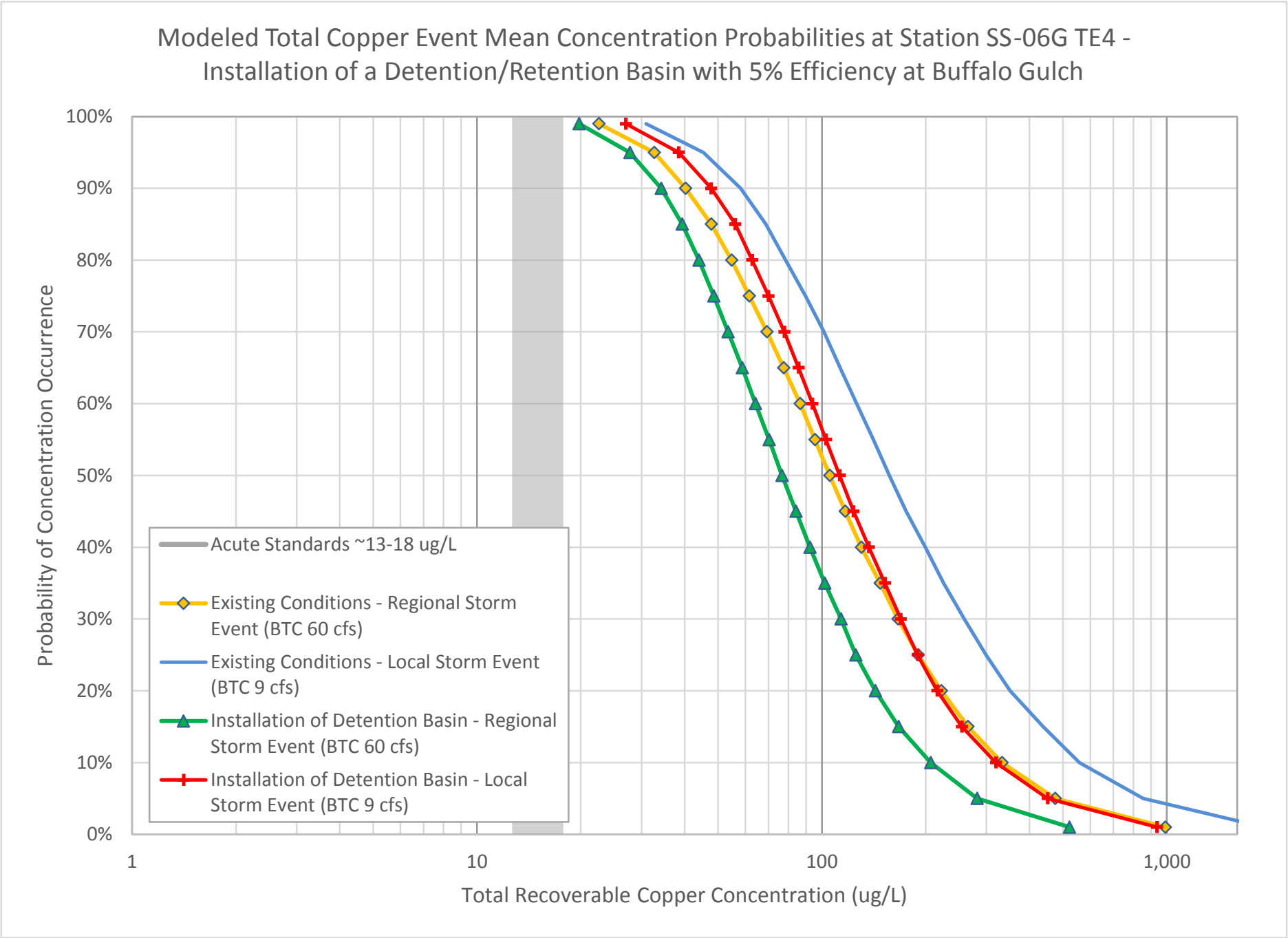


Figure E-11
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

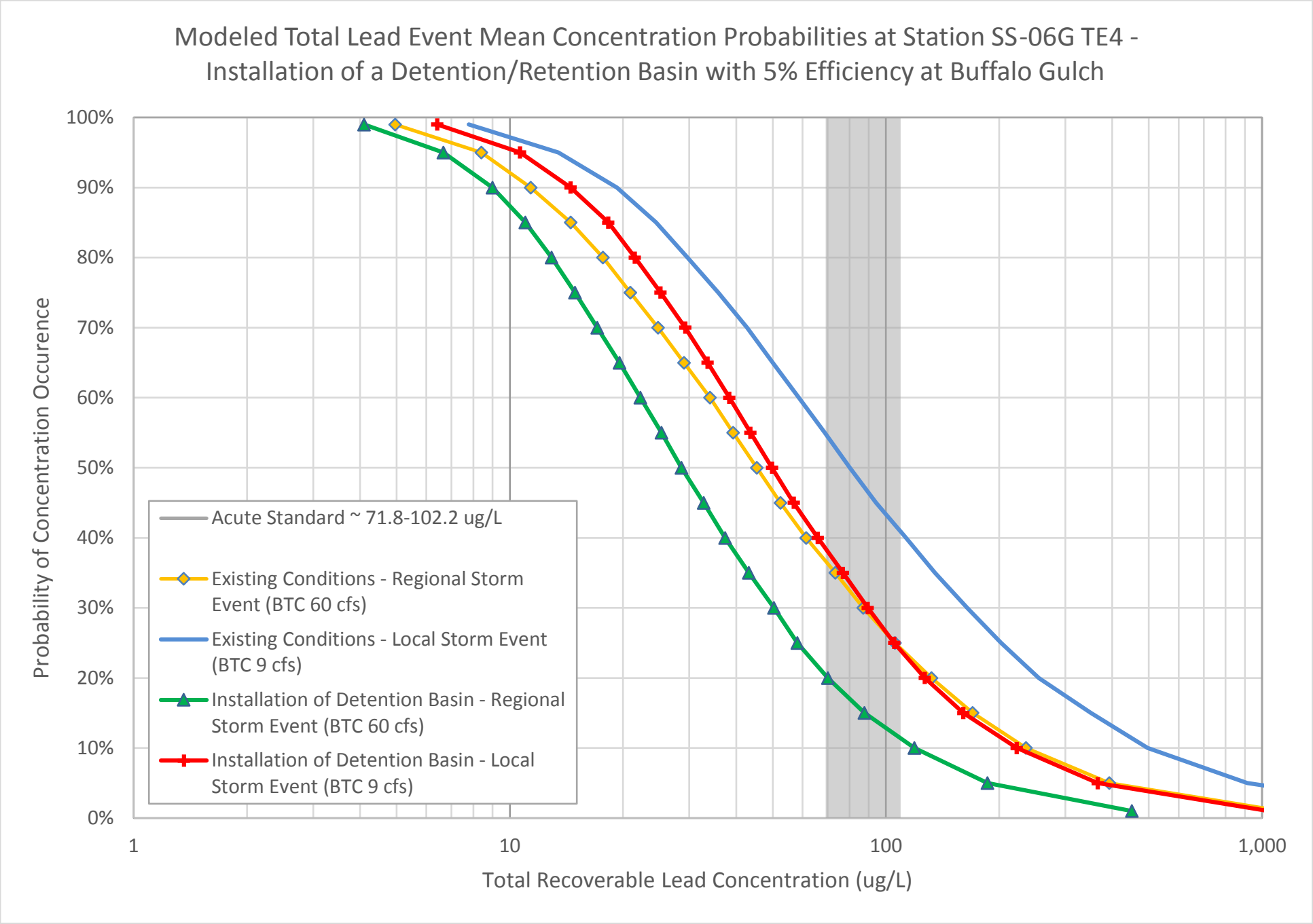


Figure E-12
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

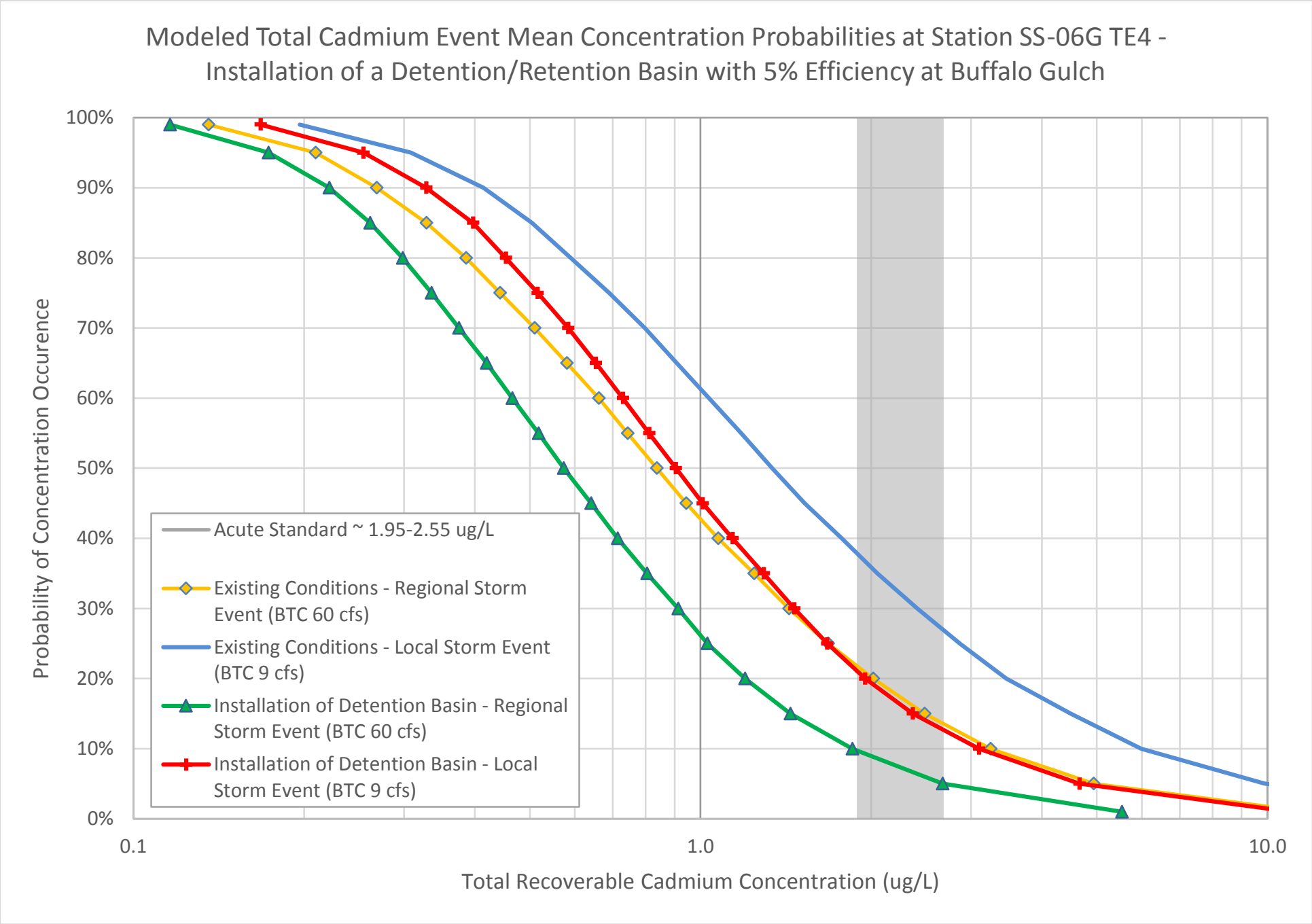


Figure E-13
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

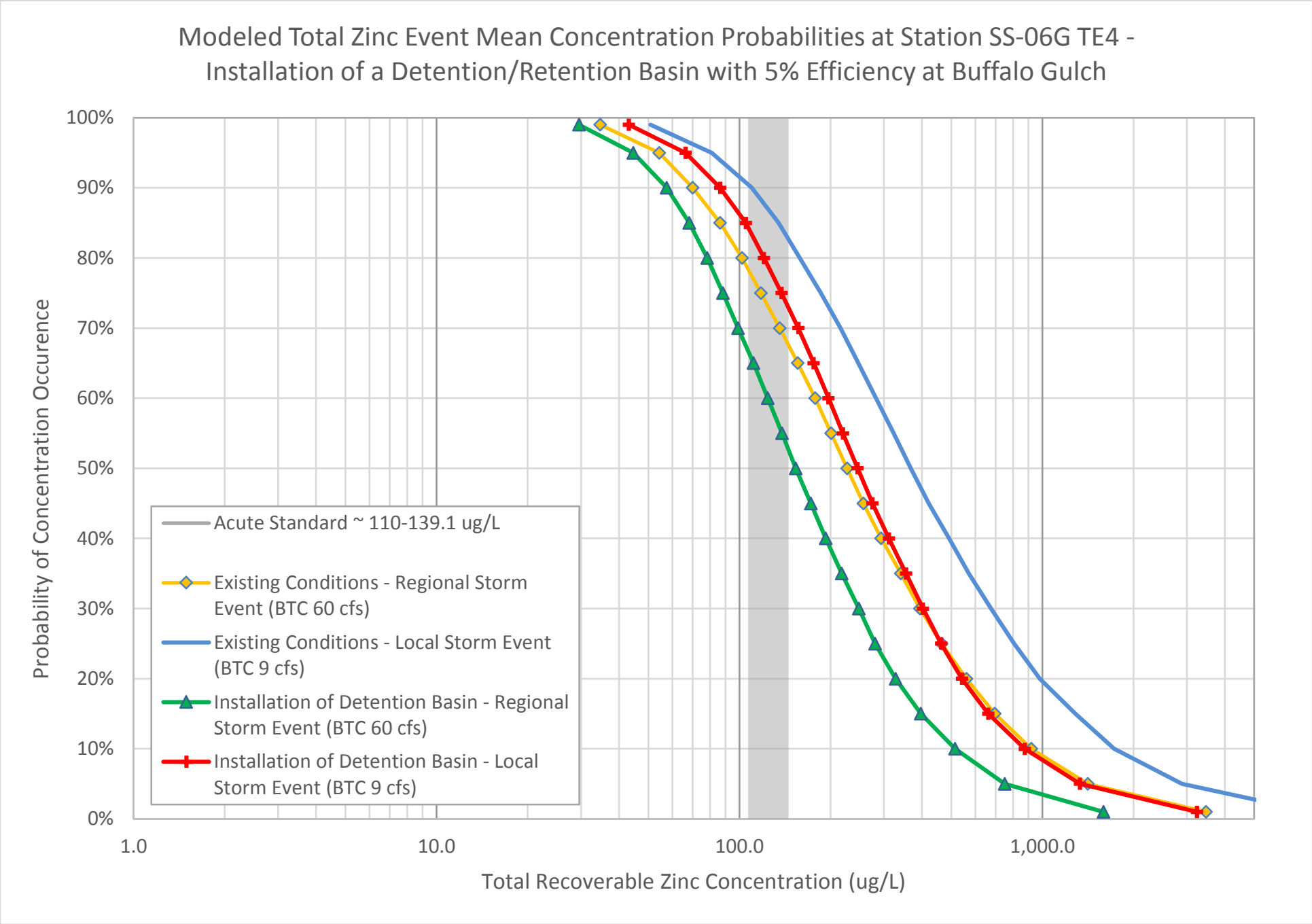


Figure E-14
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

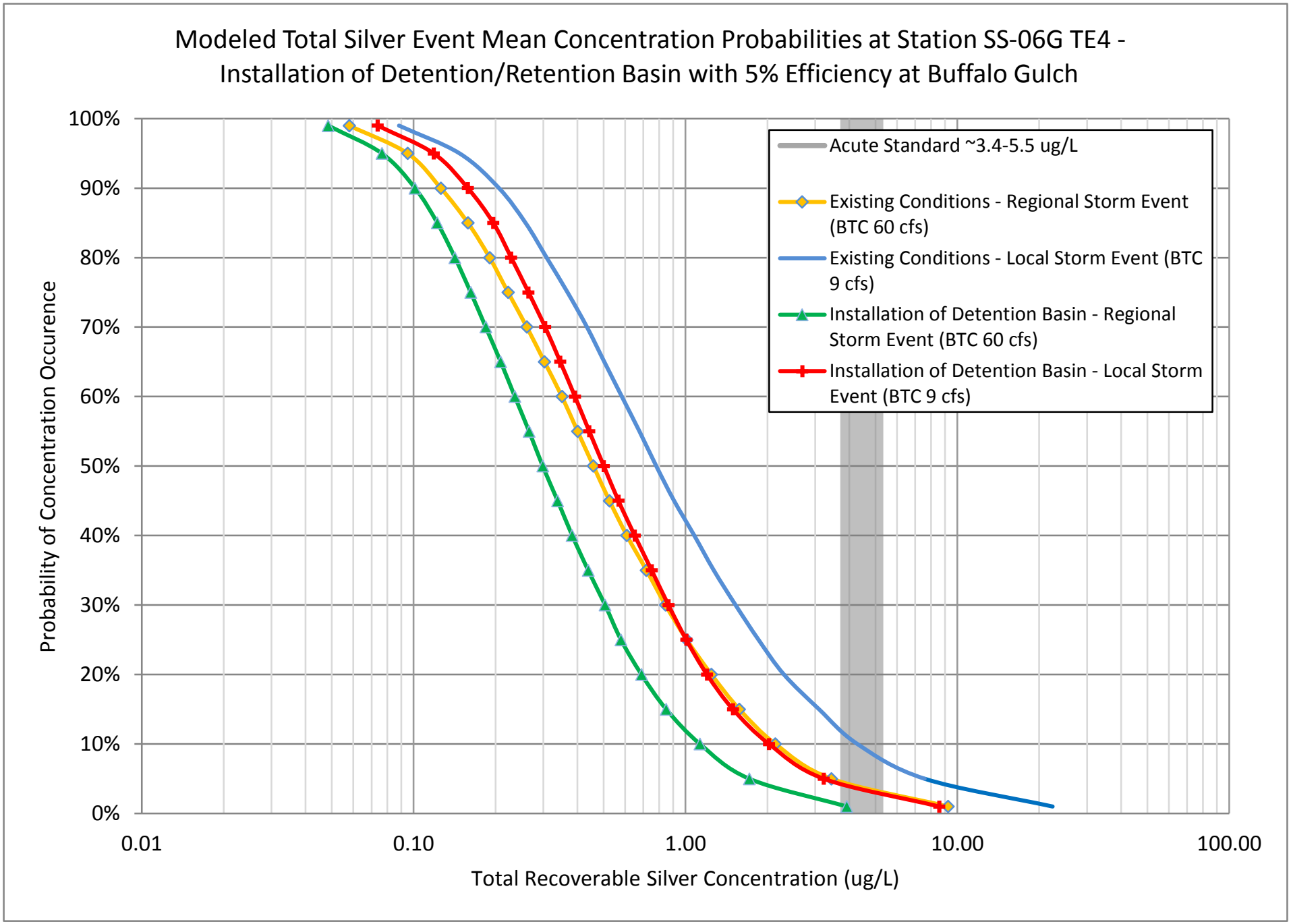


Figure E-15
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

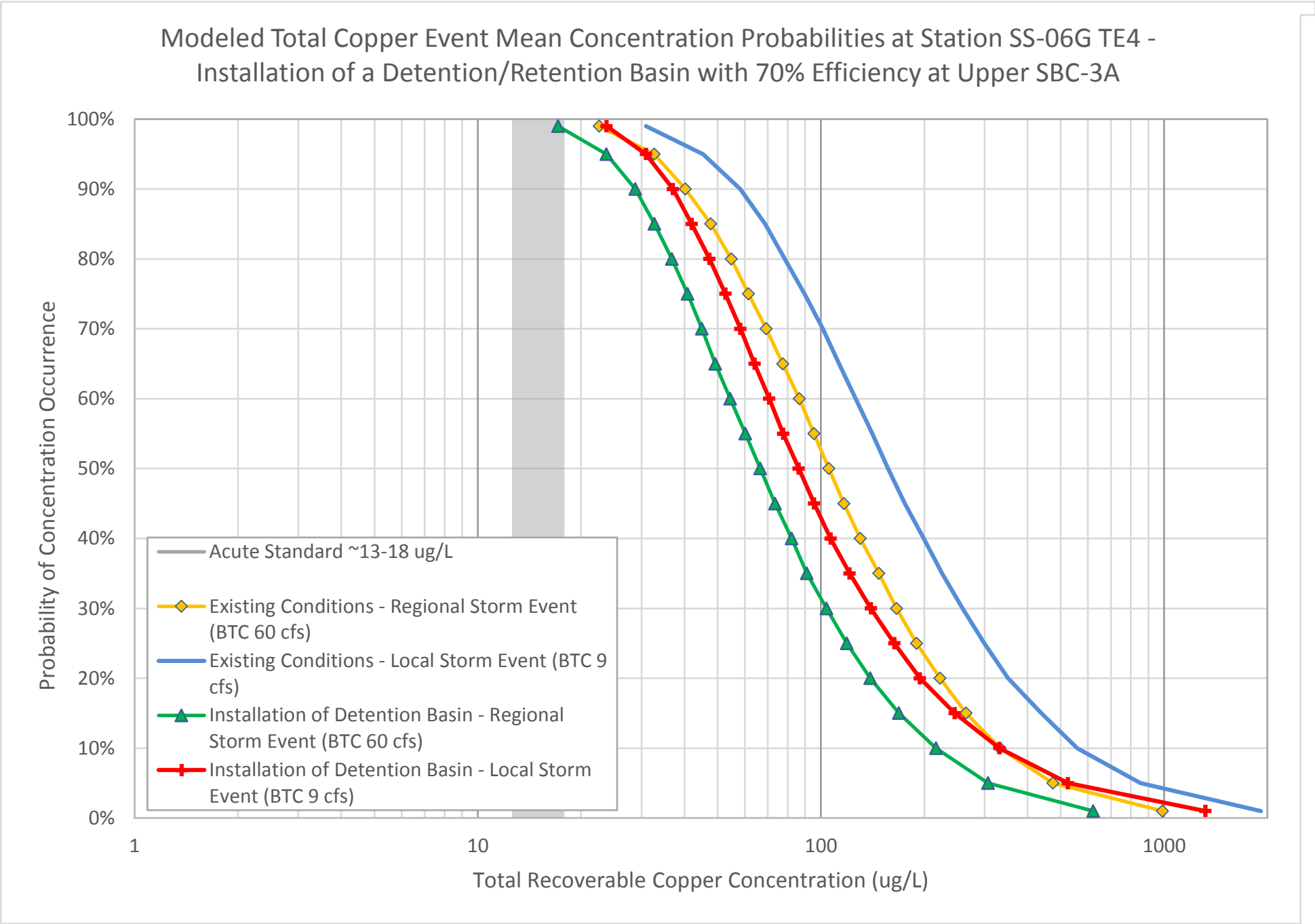


Figure E-16
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

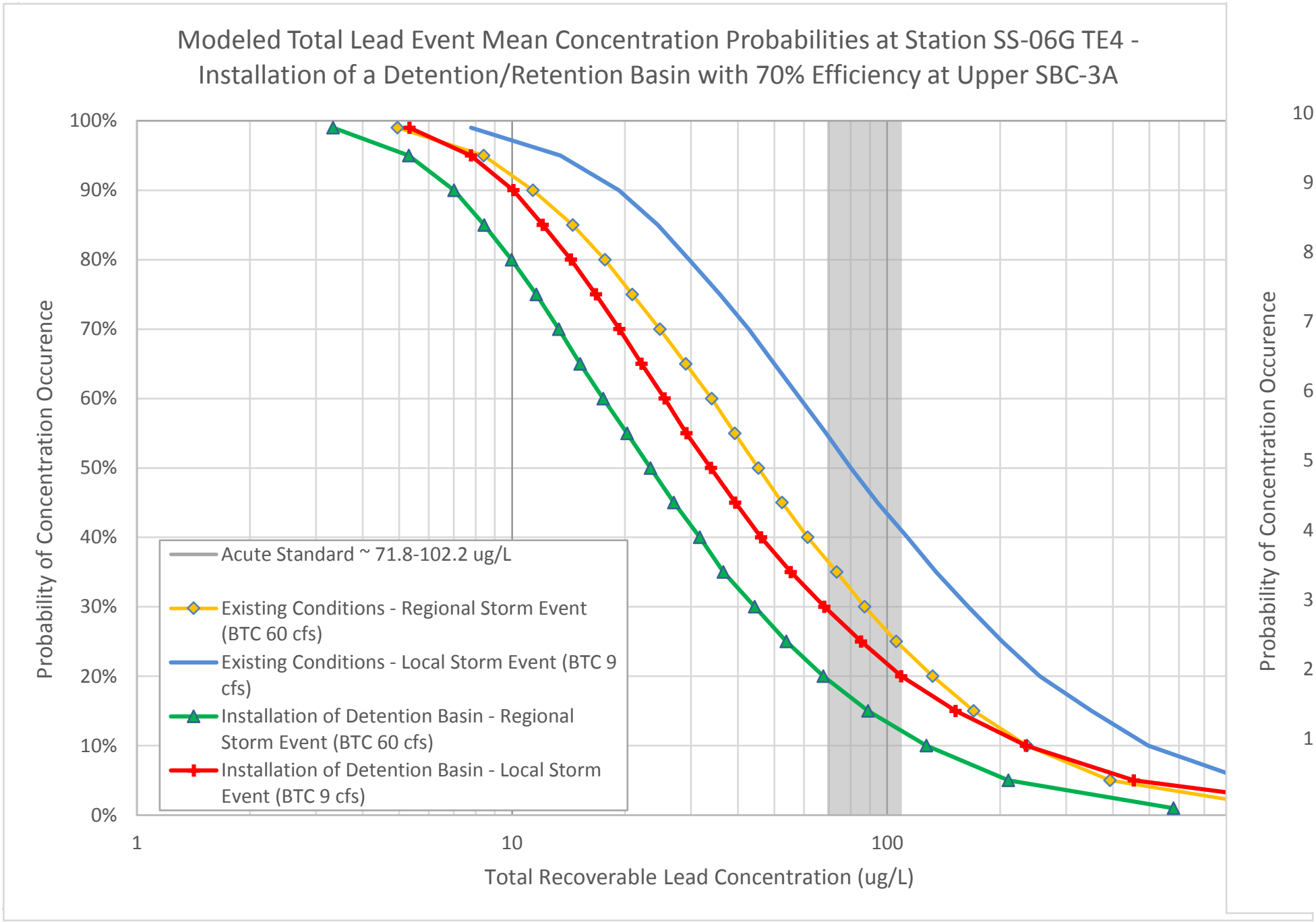


Figure E-17
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

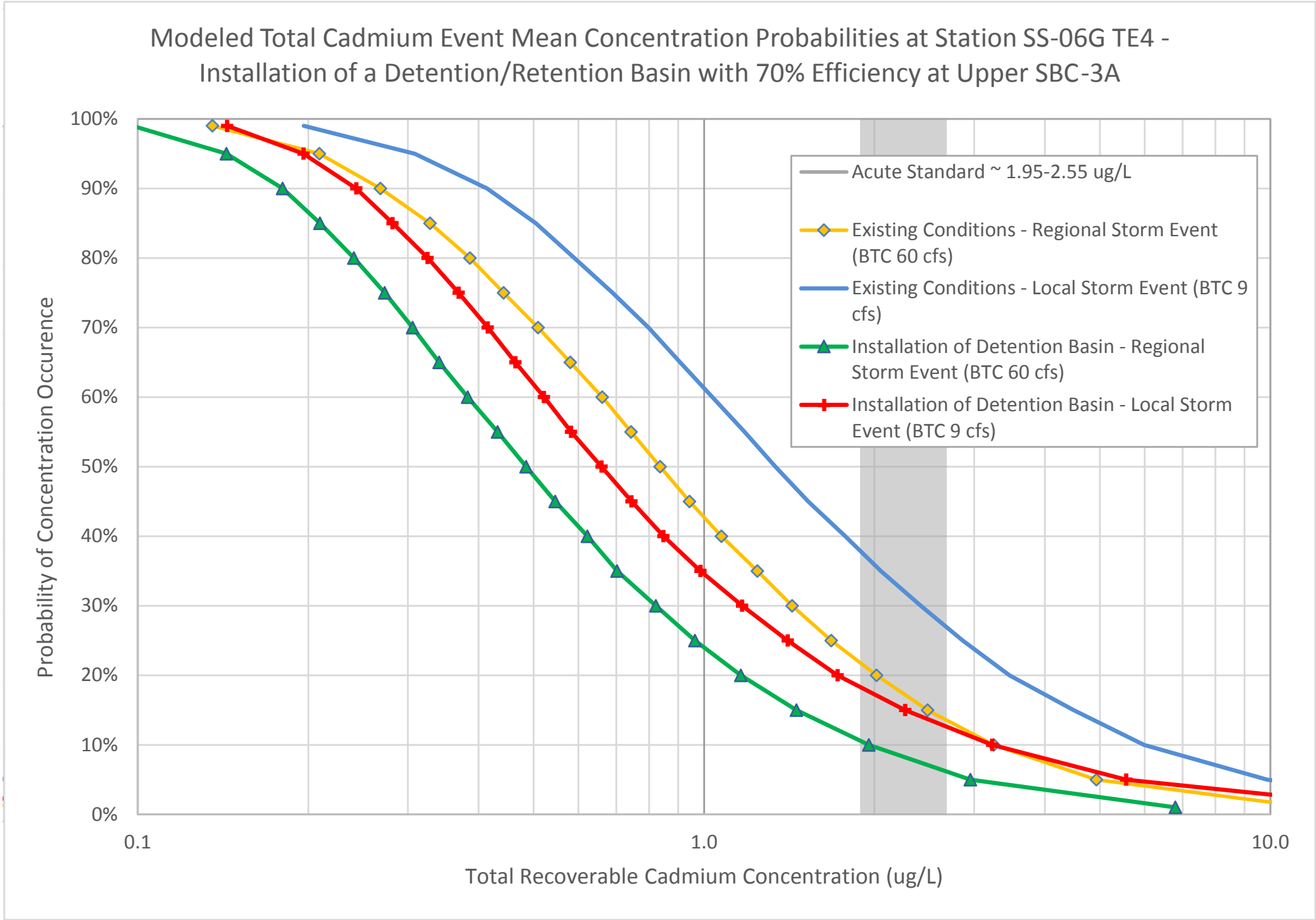


Figure E-18
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

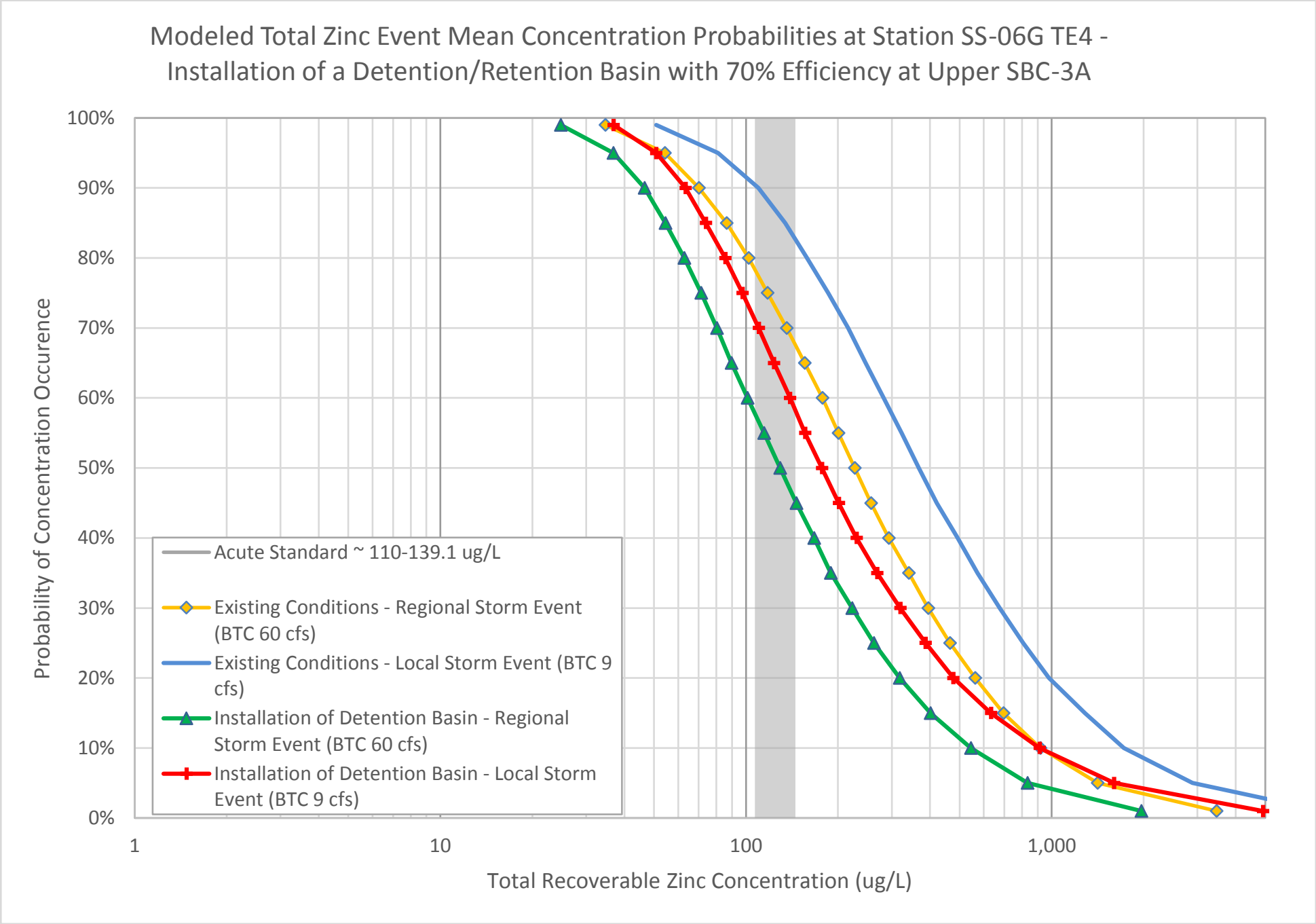


Figure E-19
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

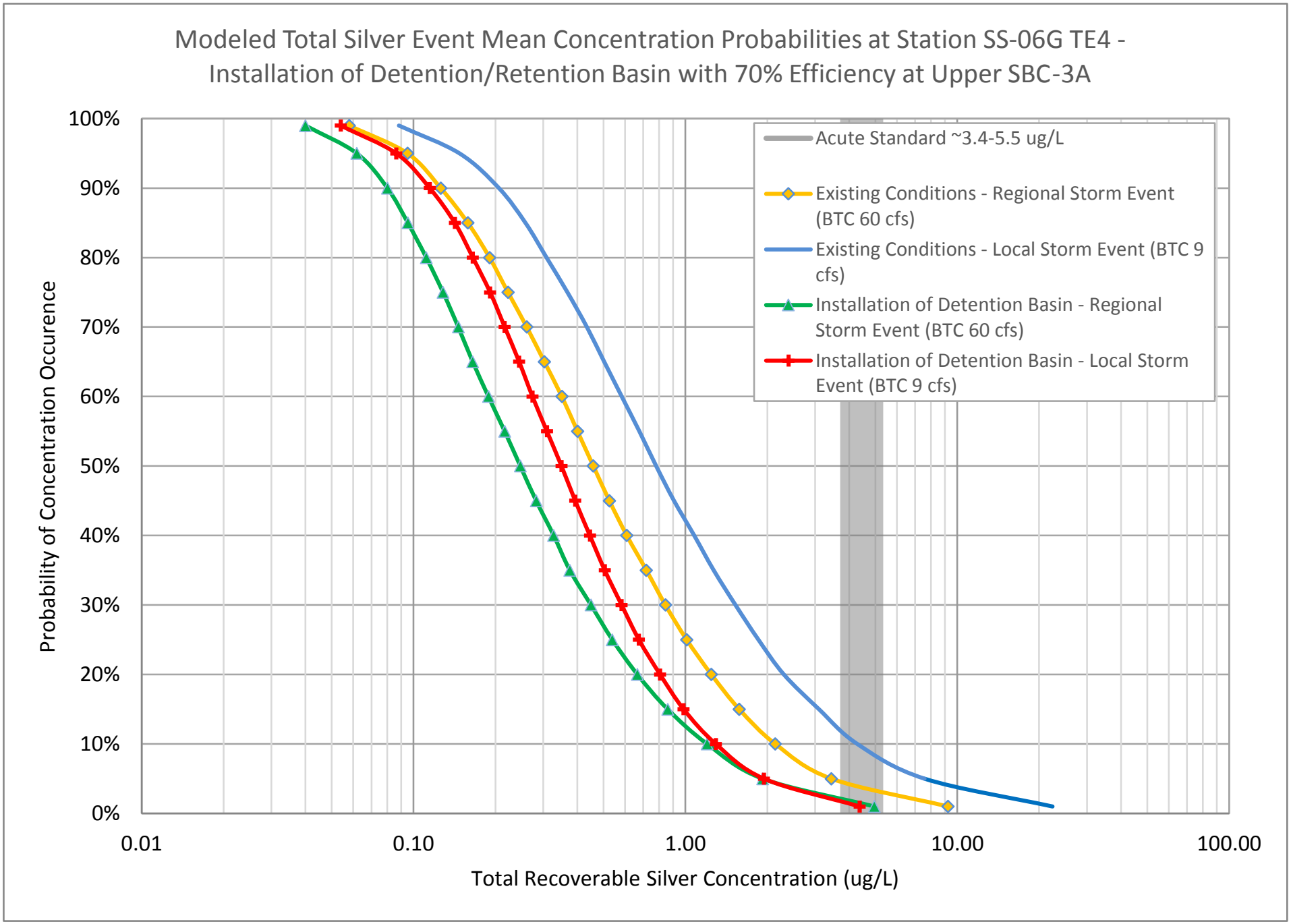


Figure E-20
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

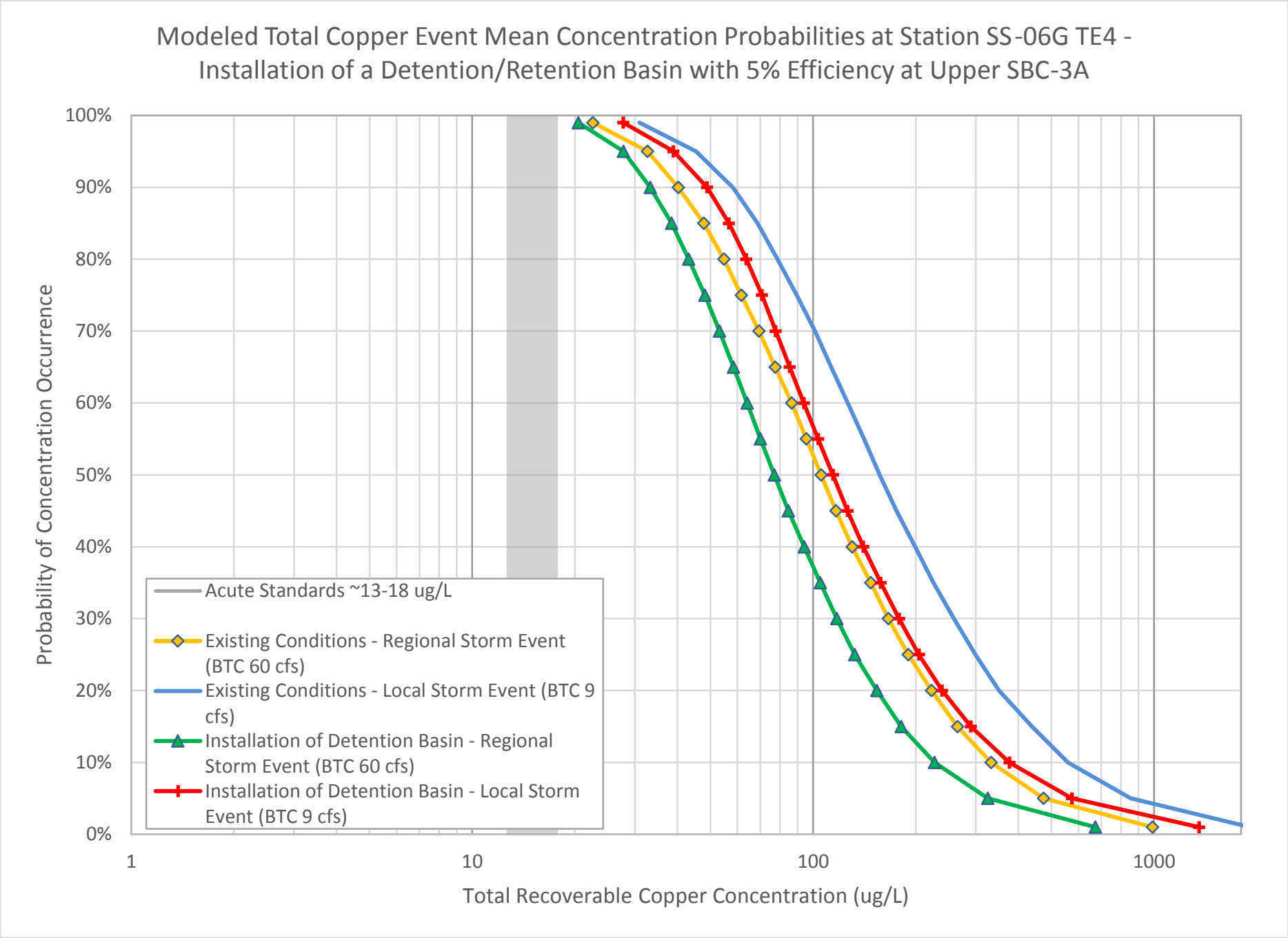


Figure E-21
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

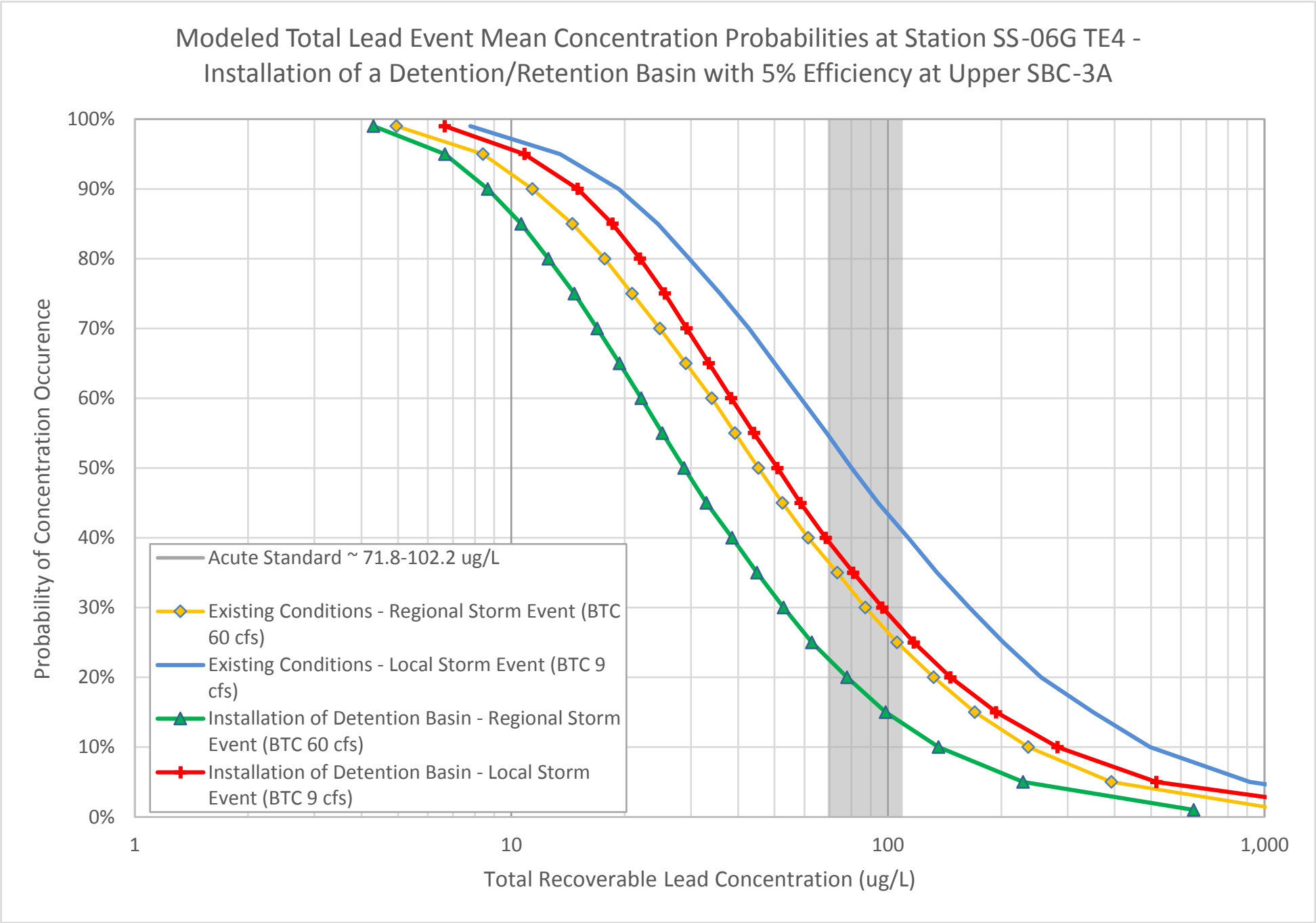


Figure E-22
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

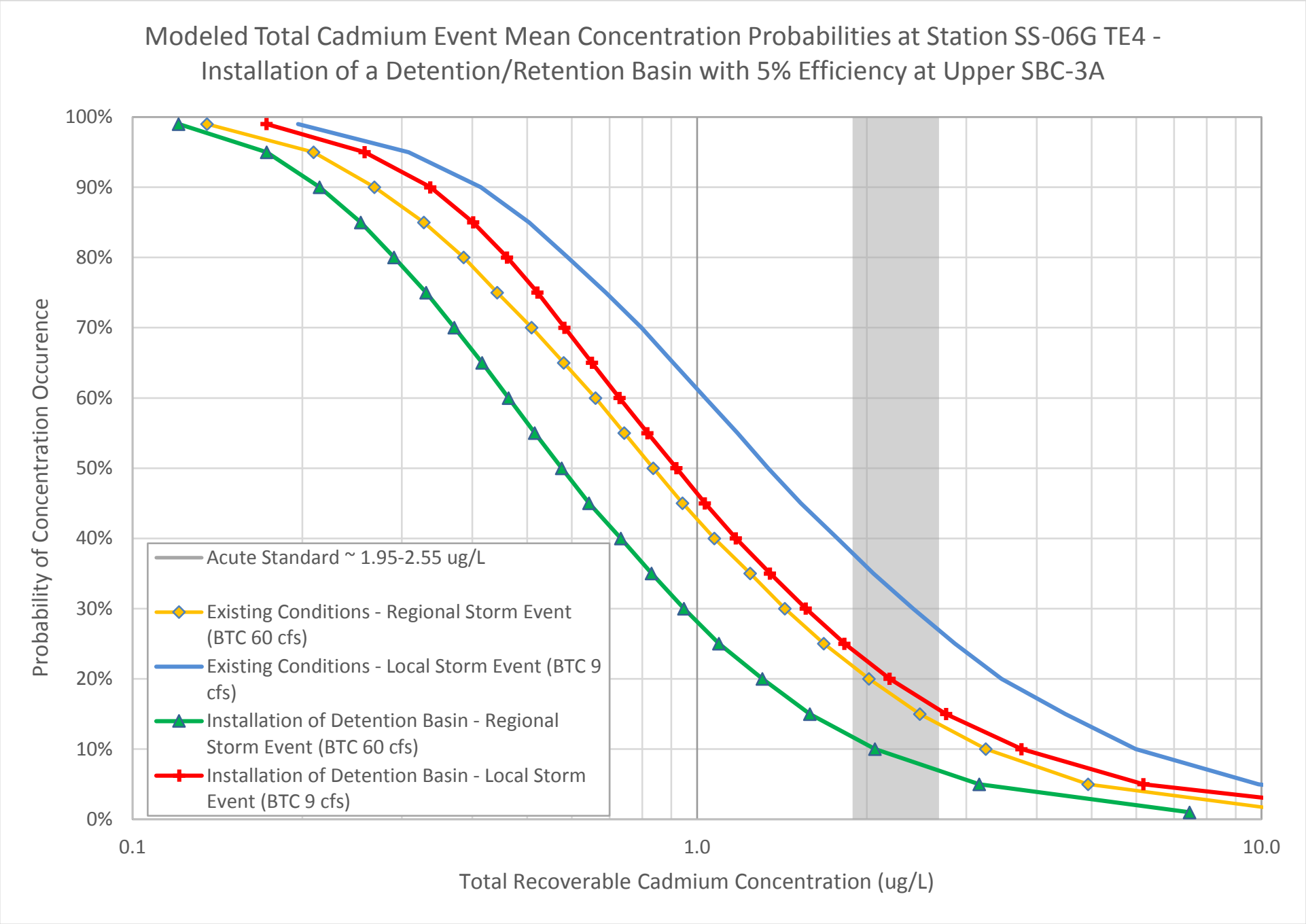


Figure E-23
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

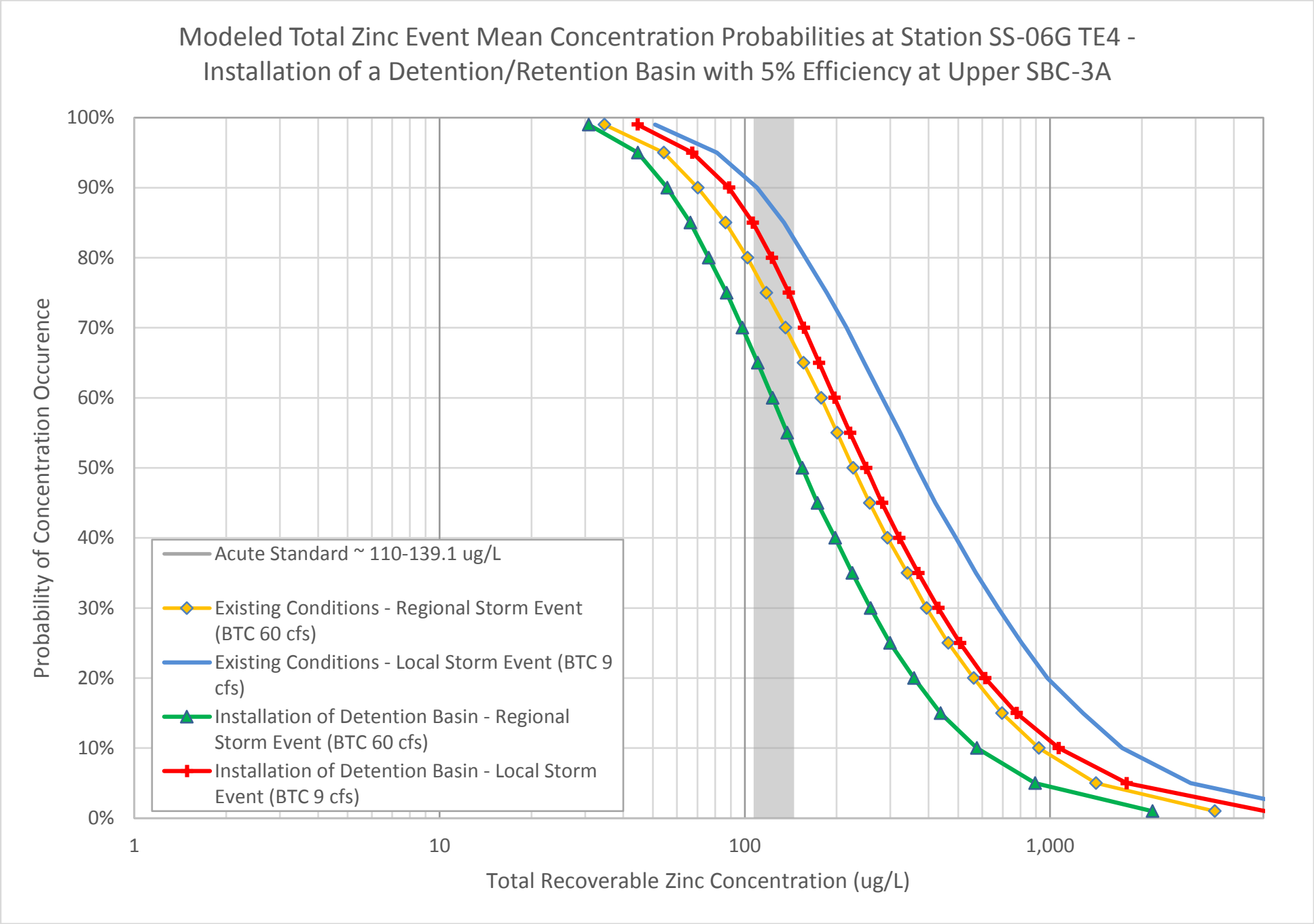


Figure E-24
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

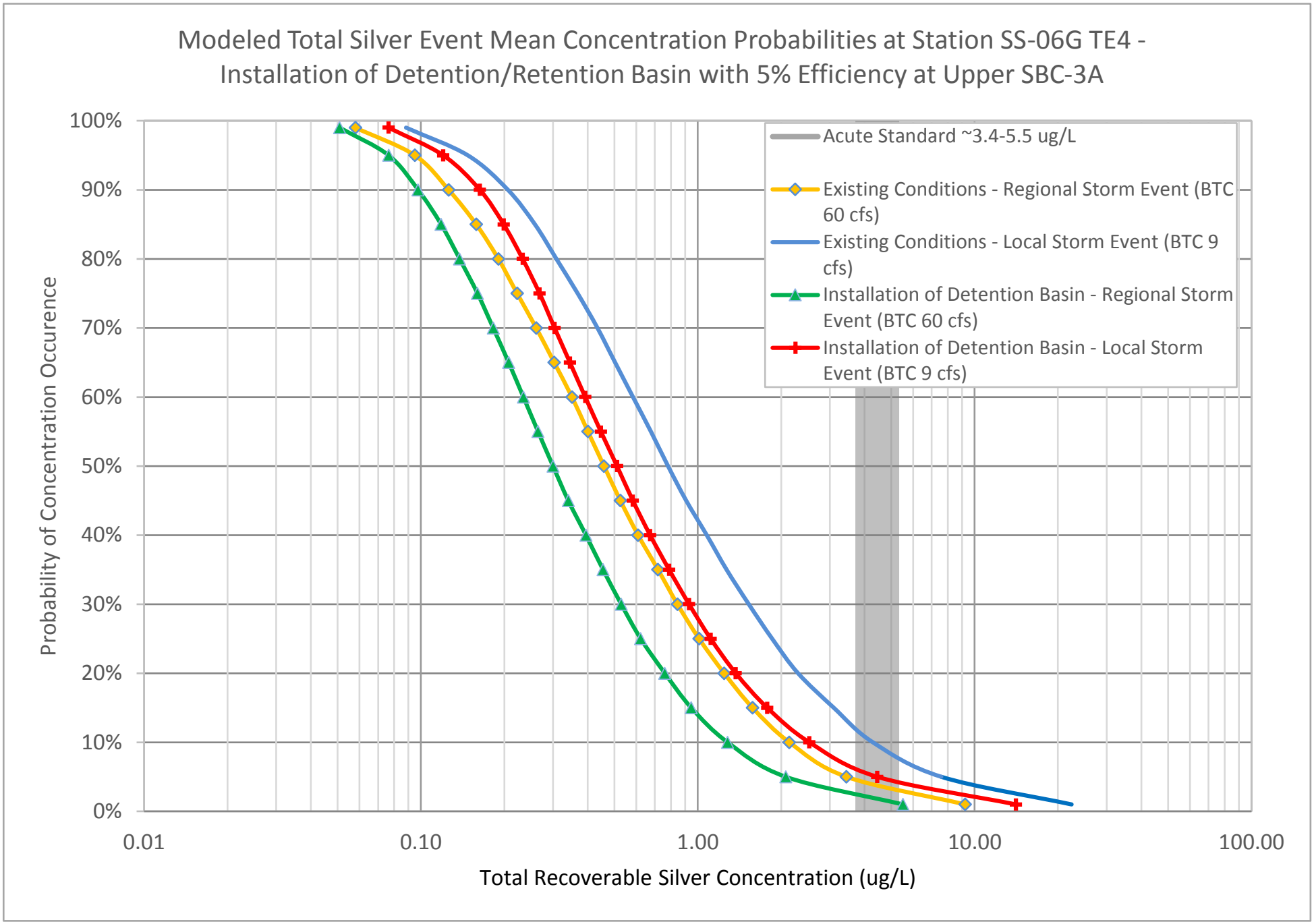


Figure E-25
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

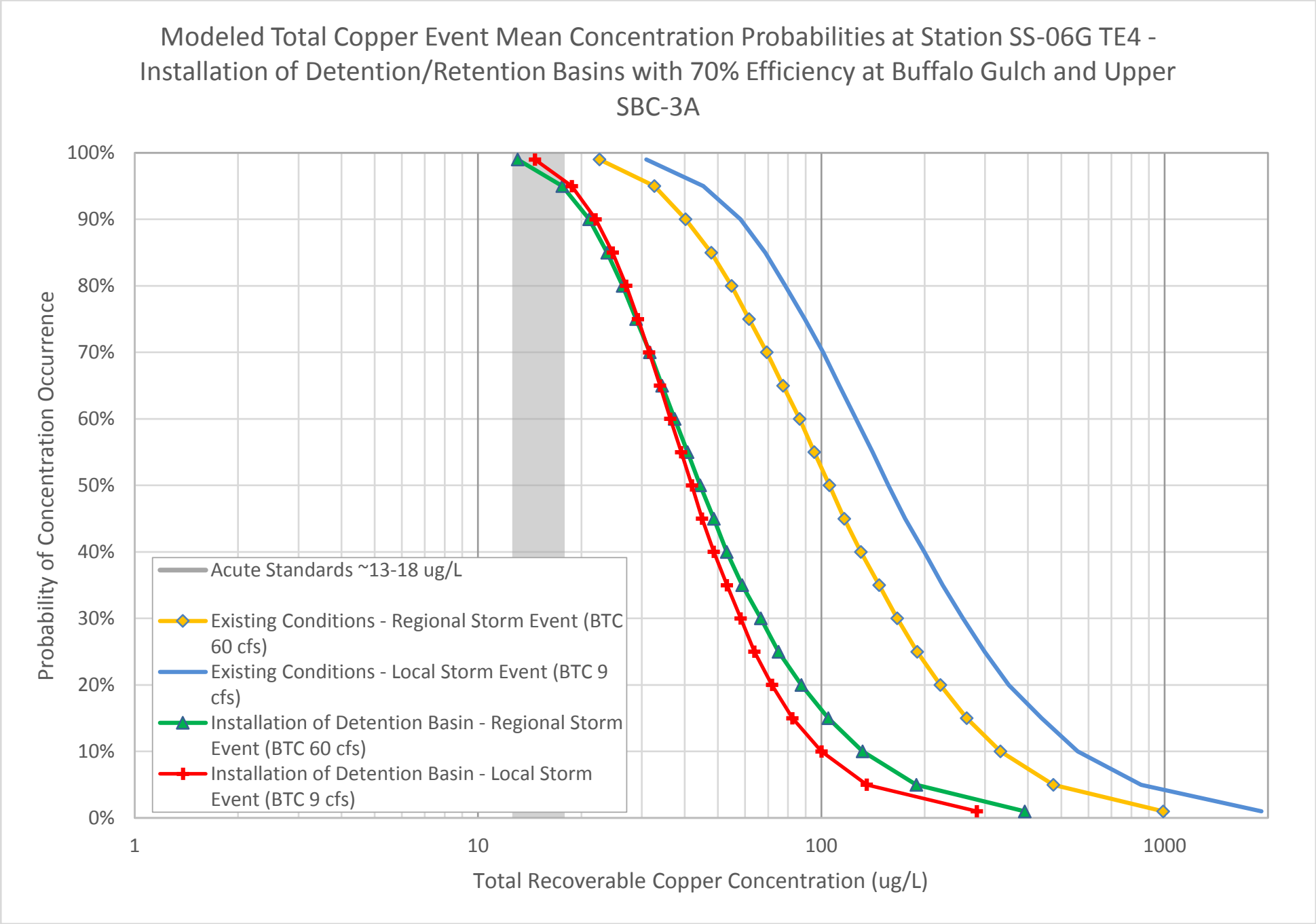


Figure E-26
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

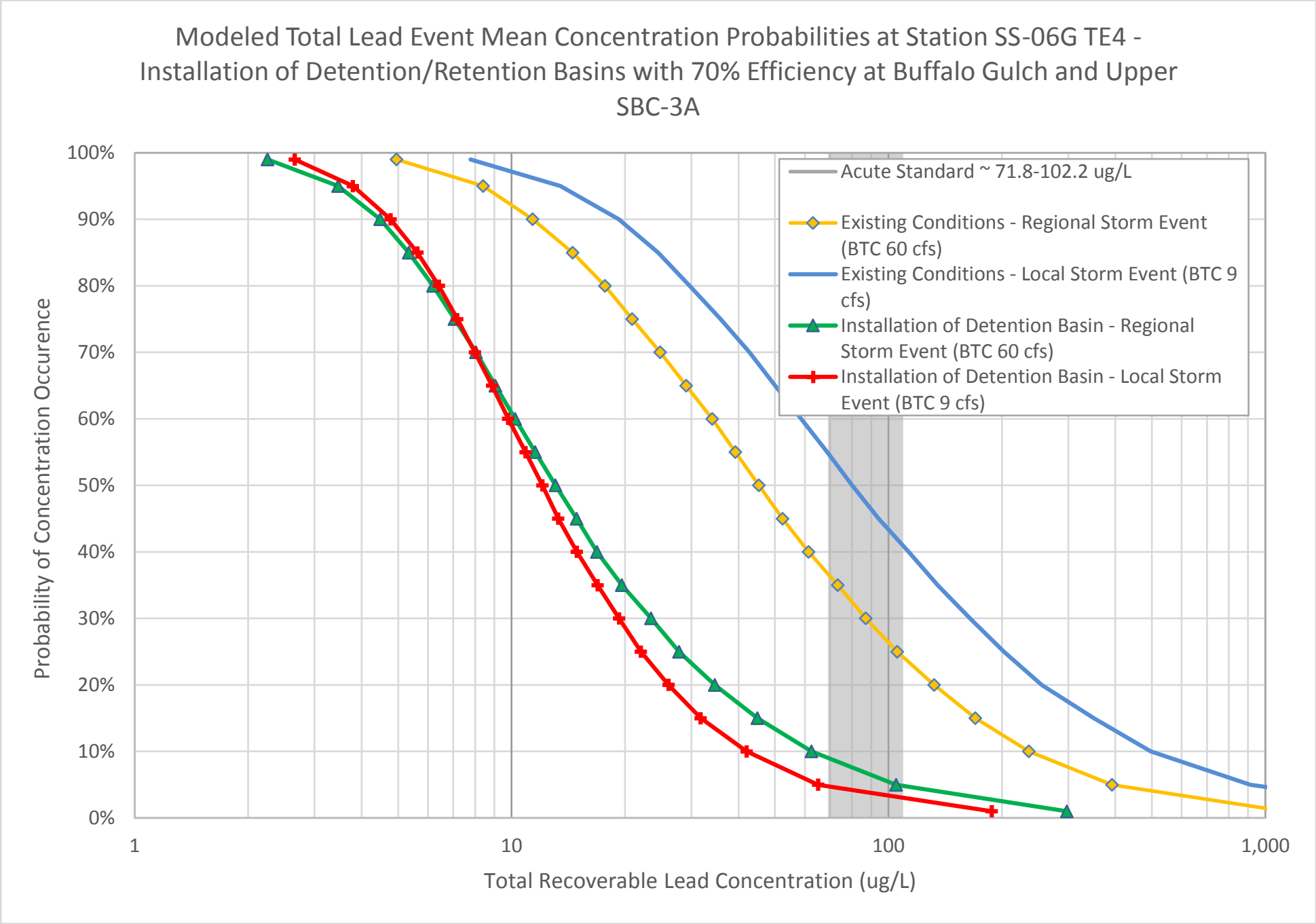


Figure E-27
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

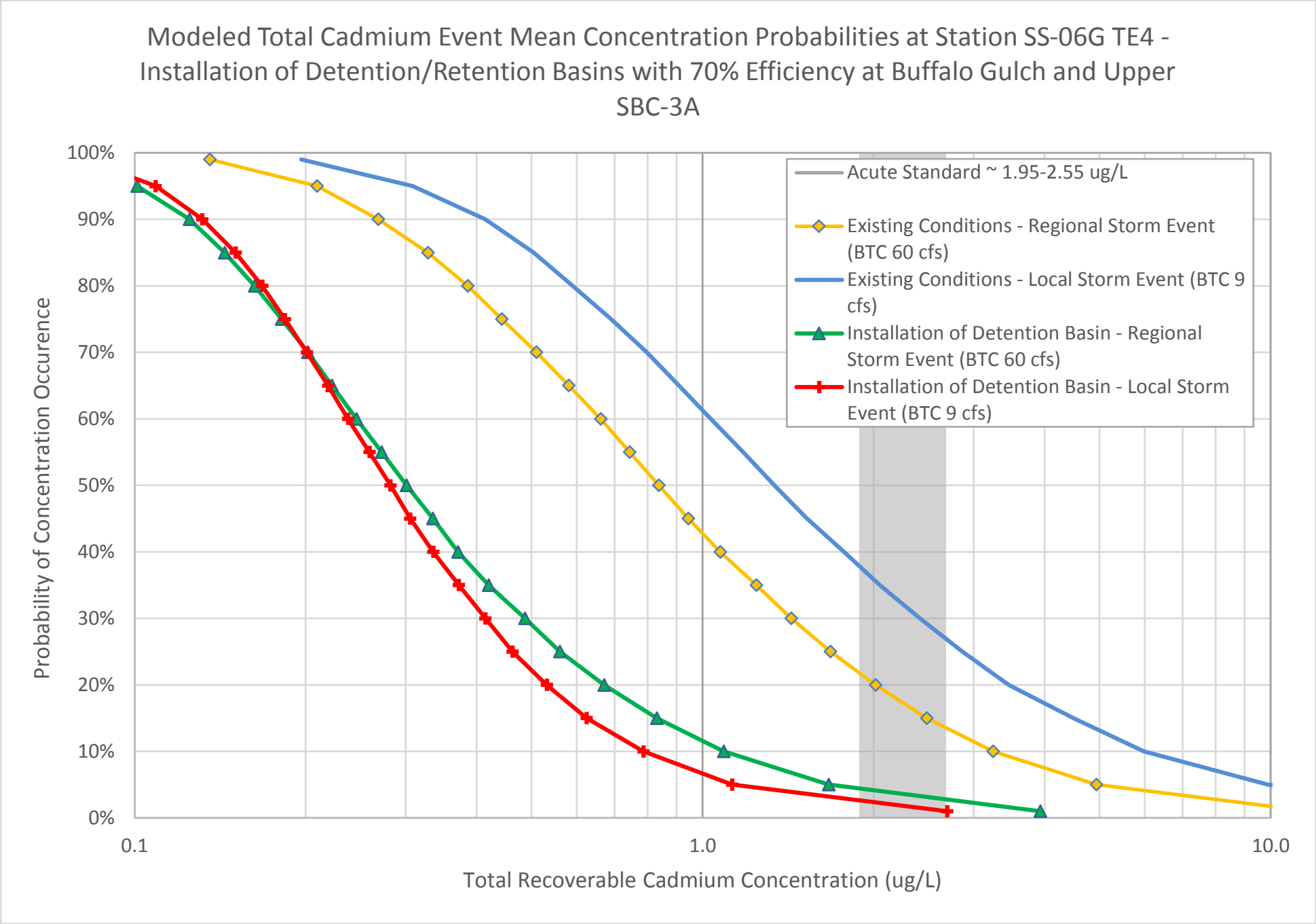


Figure E-28
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

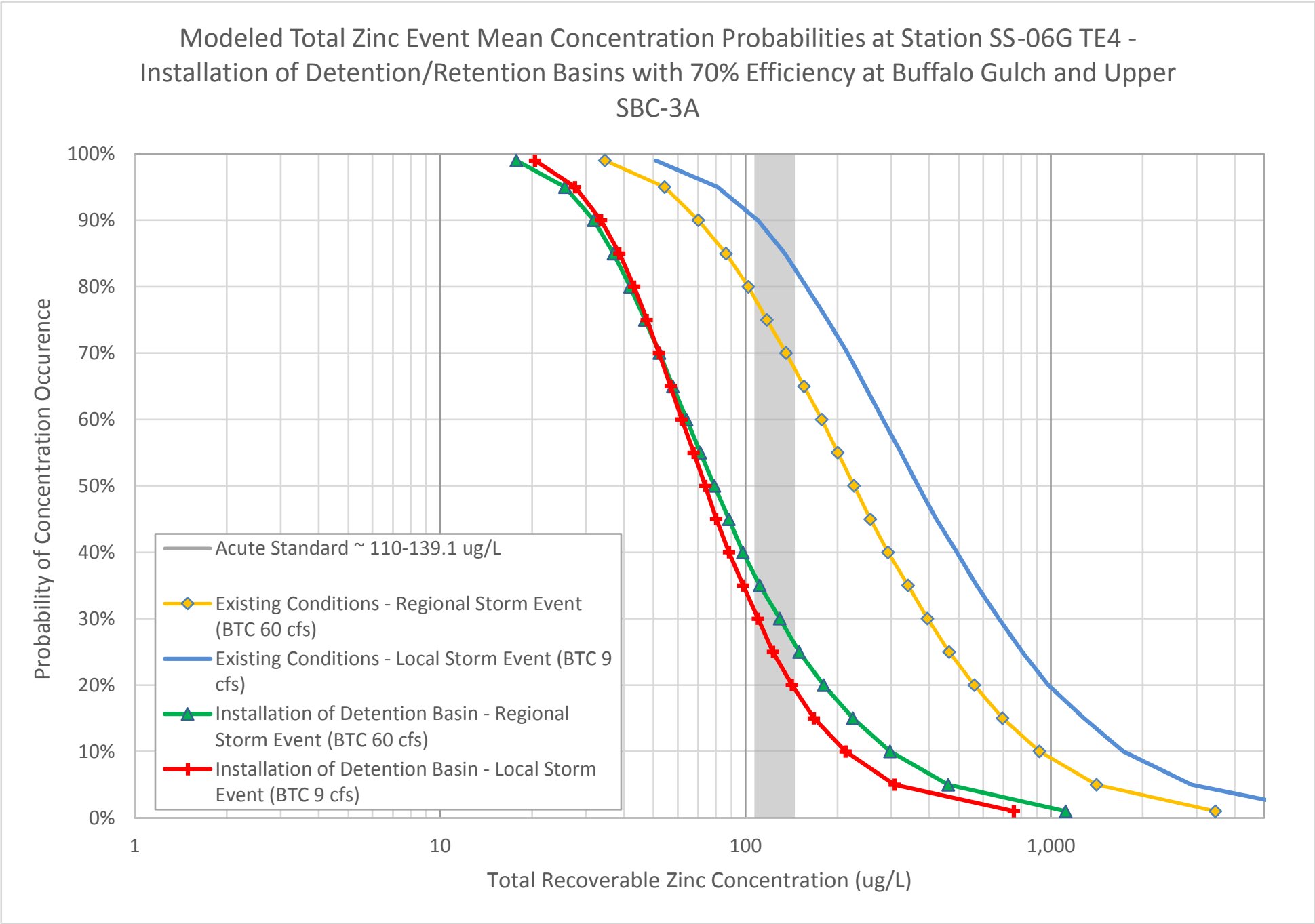


Figure E-29
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

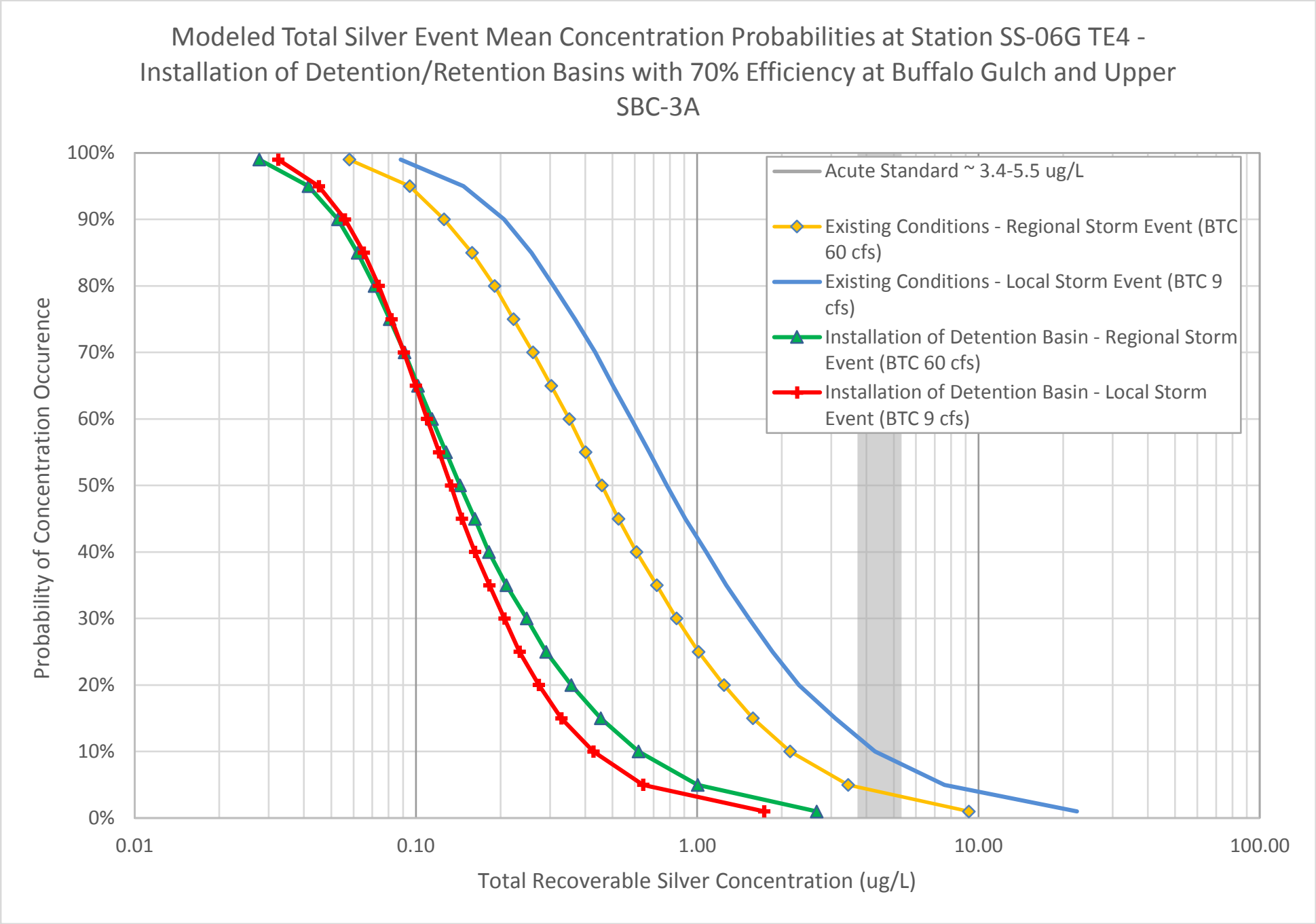


Figure E-30
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

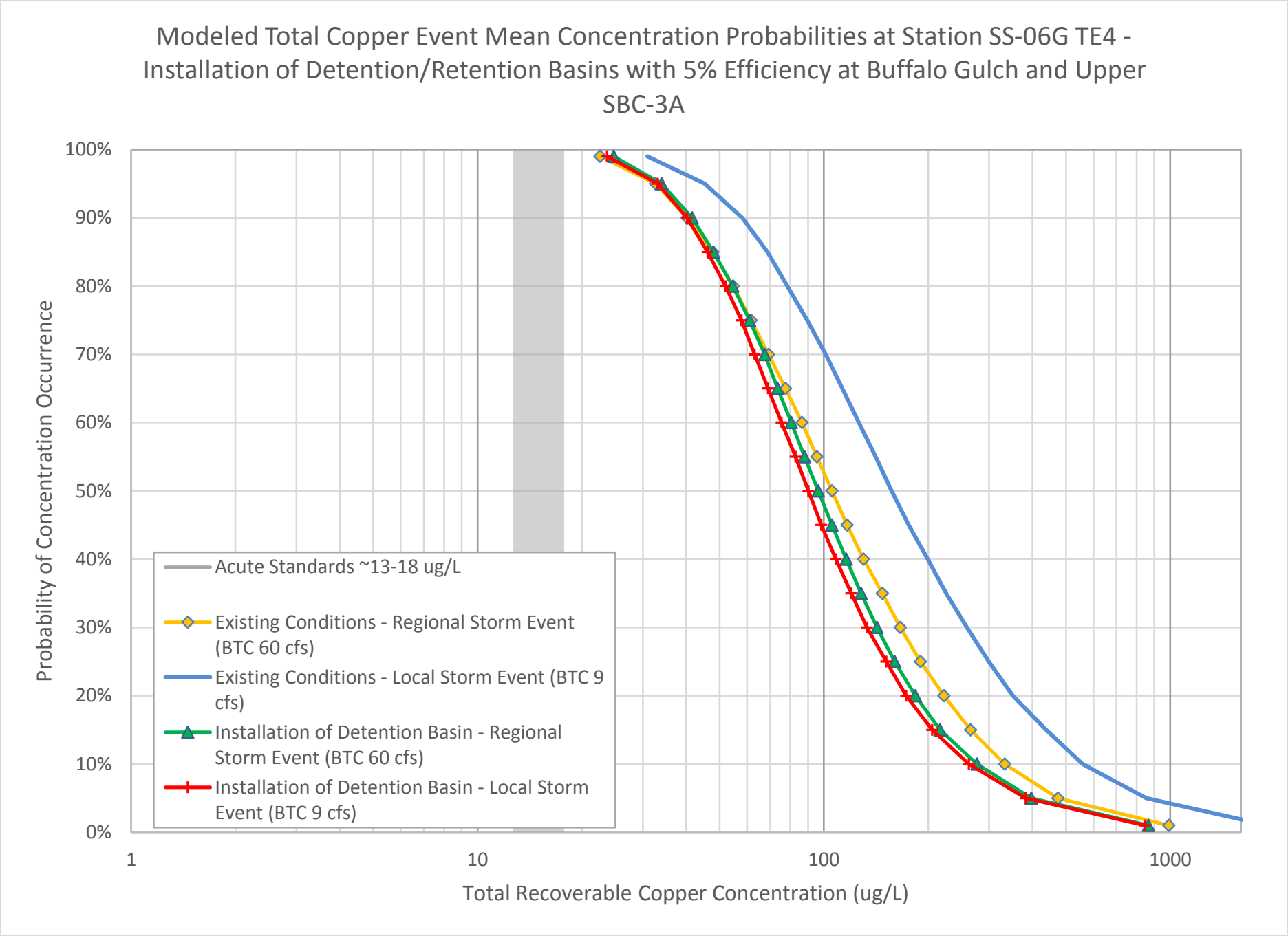


Figure E-31
Event Mean Concentration Results

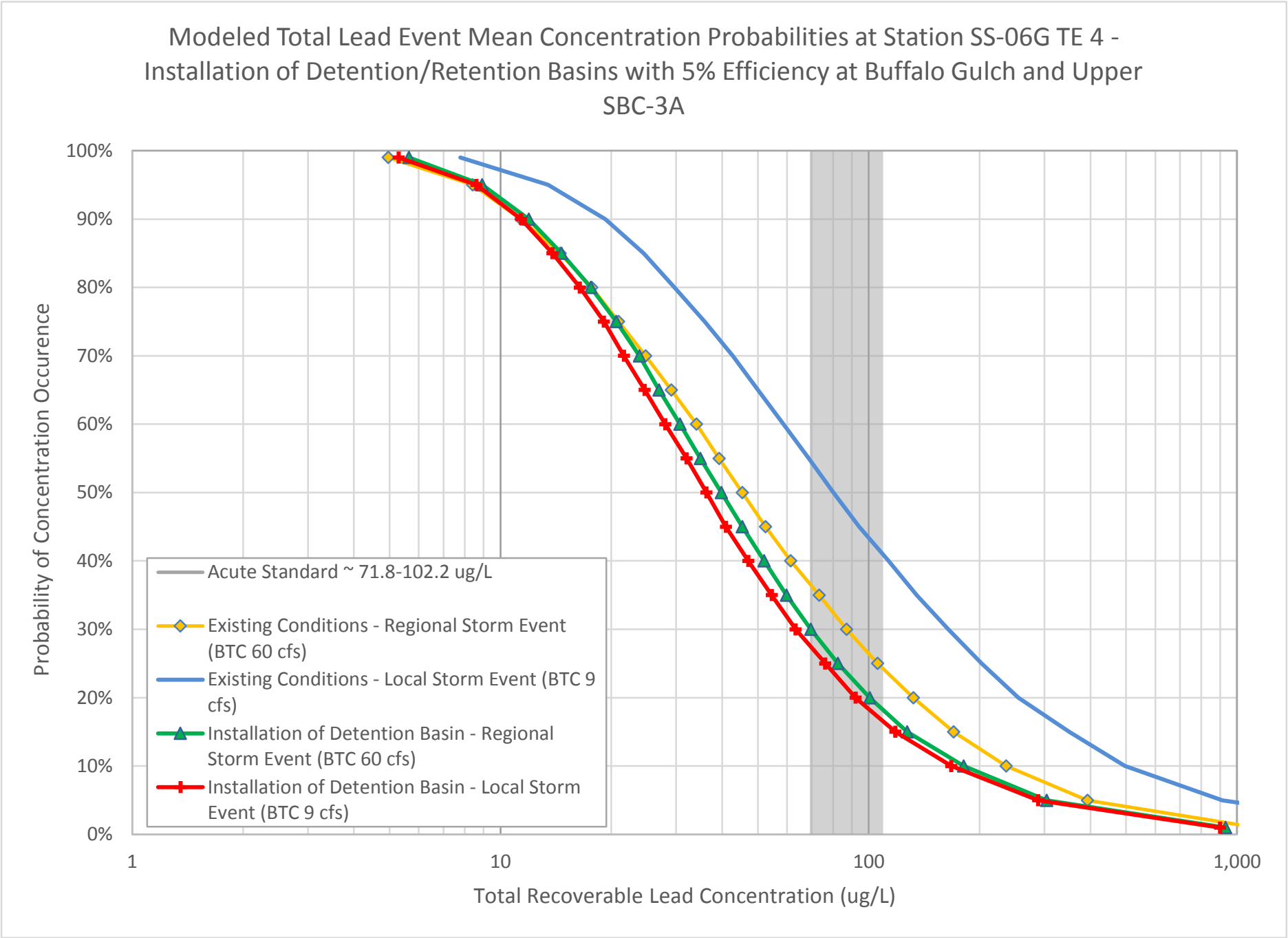


Figure E-32
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

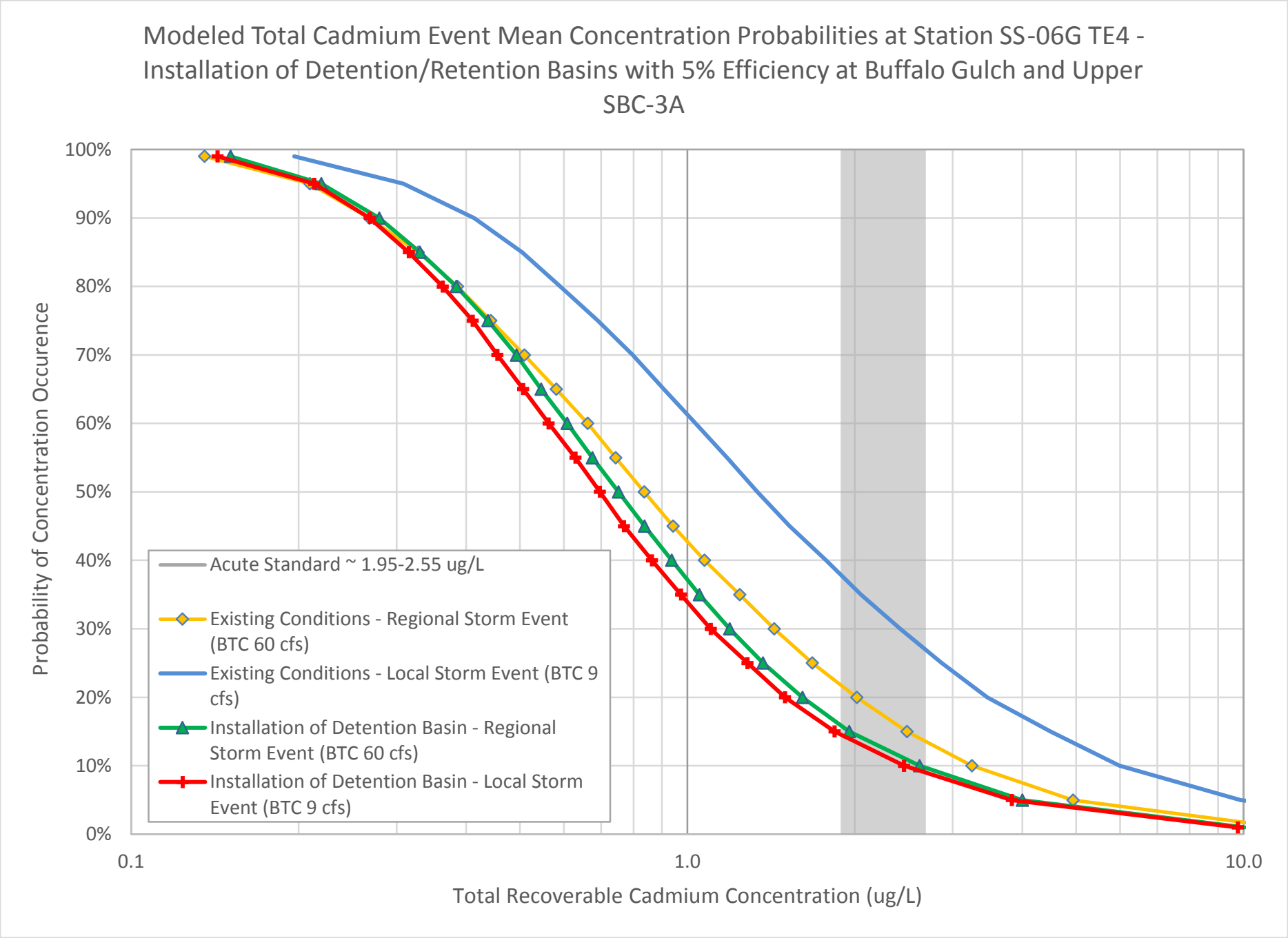


Figure E-33
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

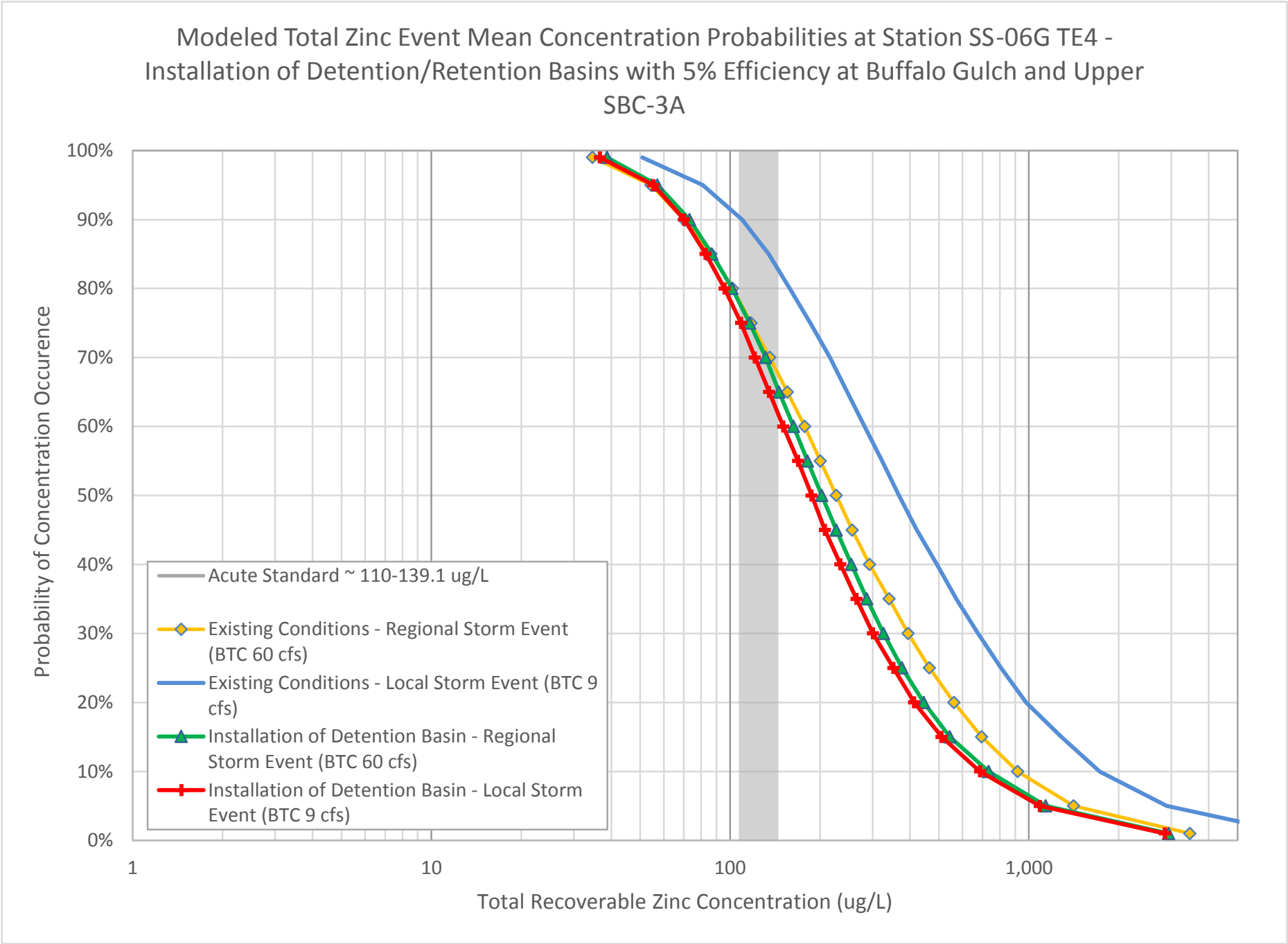


Figure E-34
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

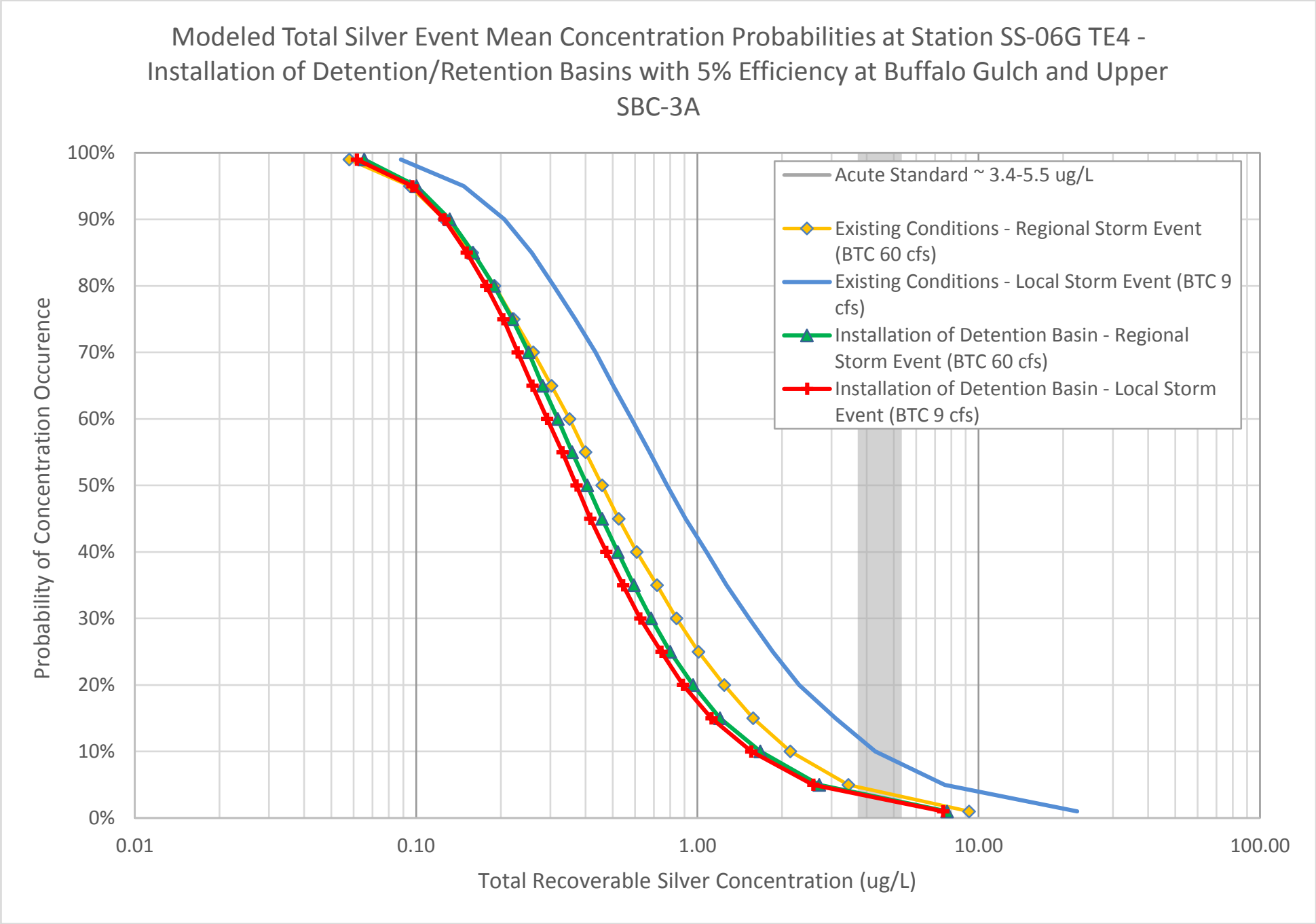


Figure E-35
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

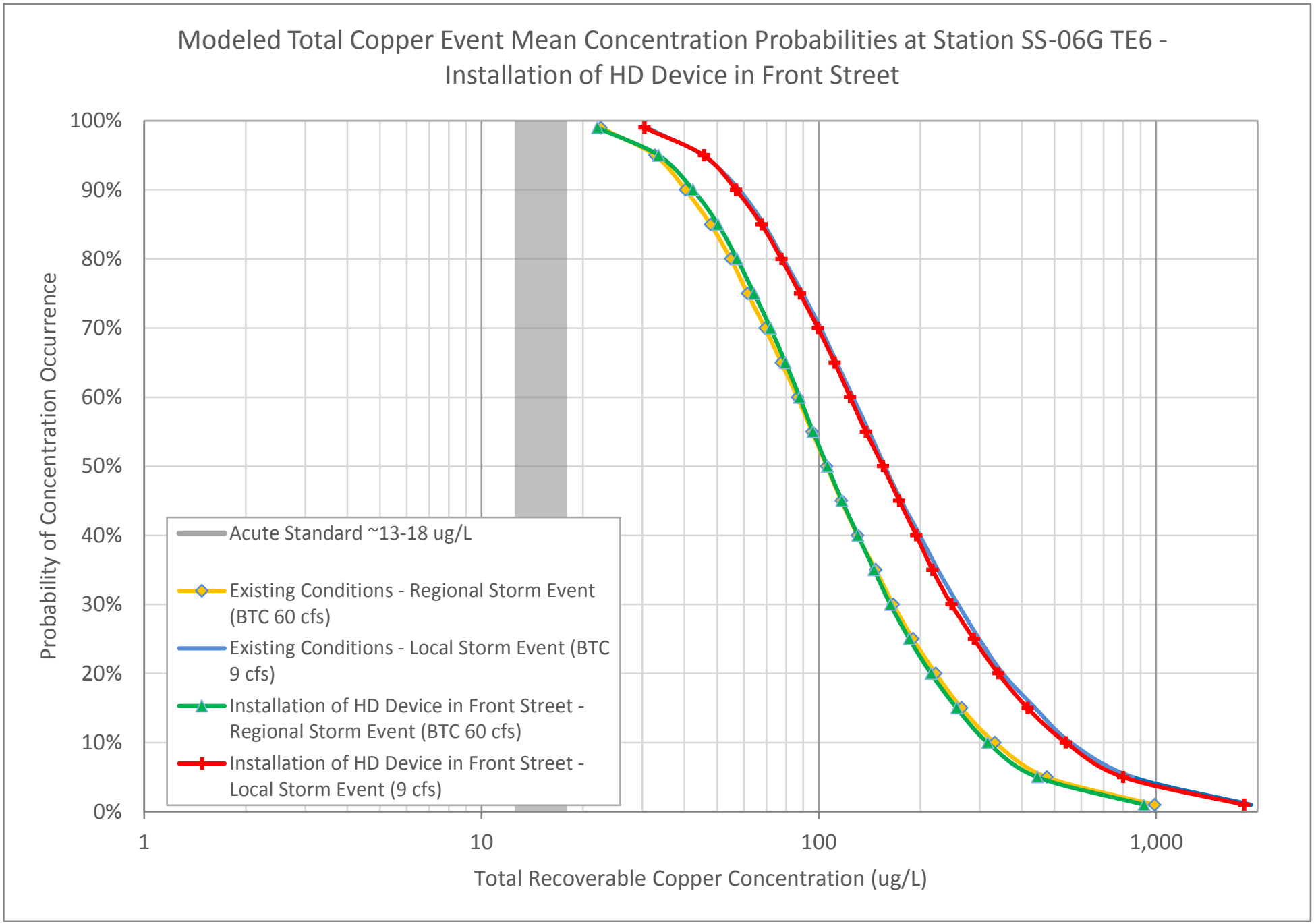


Figure E-36
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

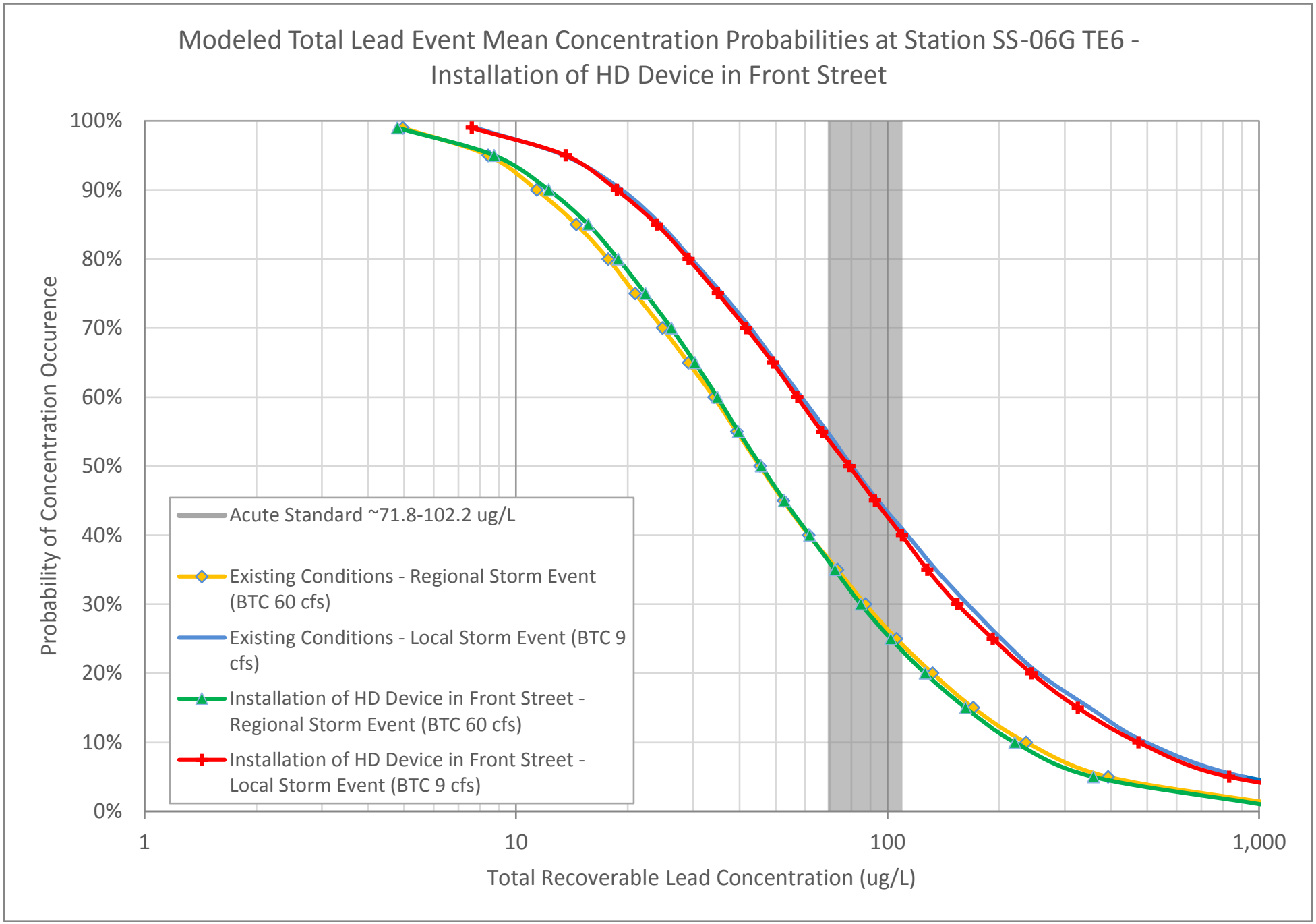


Figure E-37
Event Mean Concentration Results

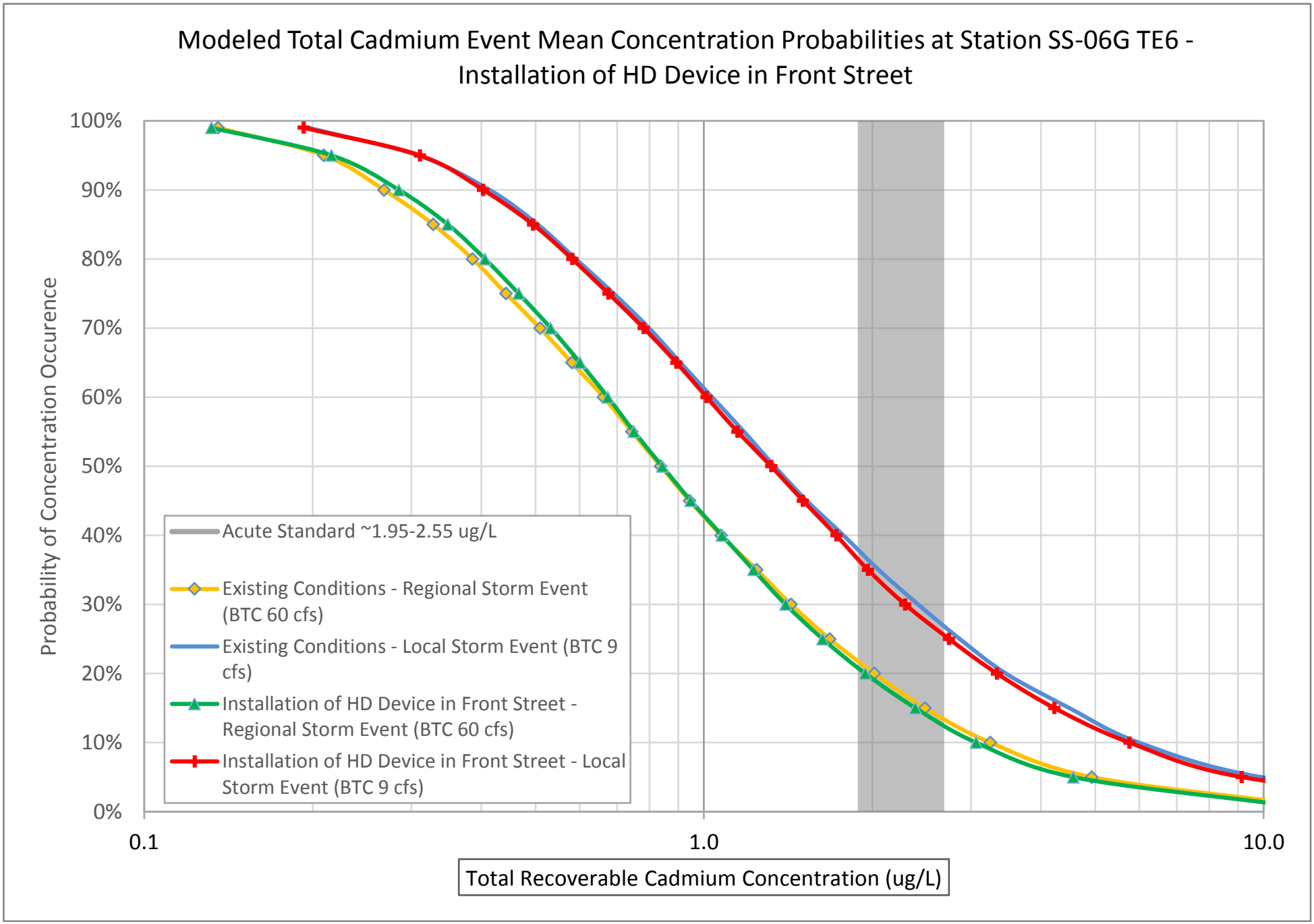


Figure E-38
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

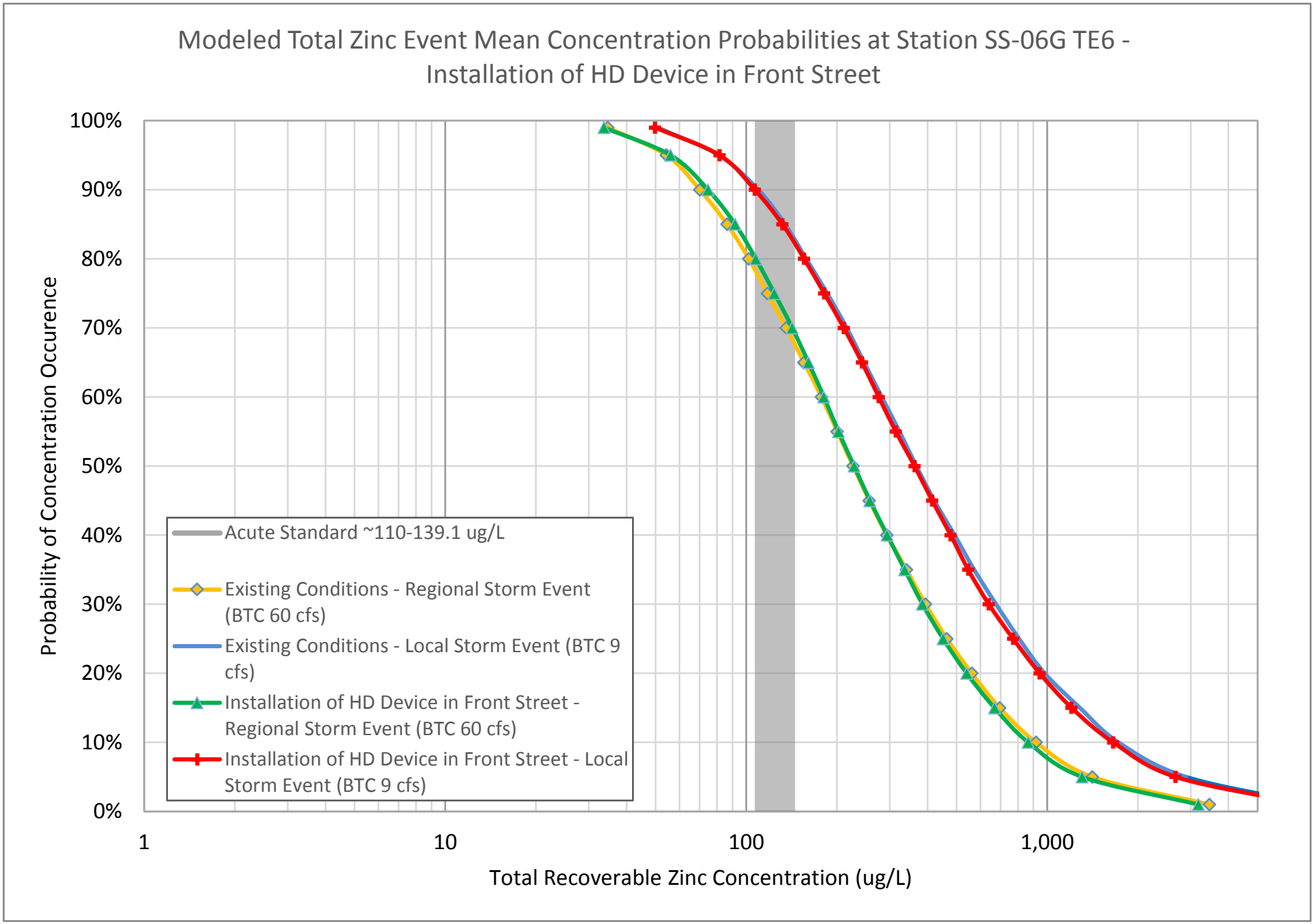


Figure E-39
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

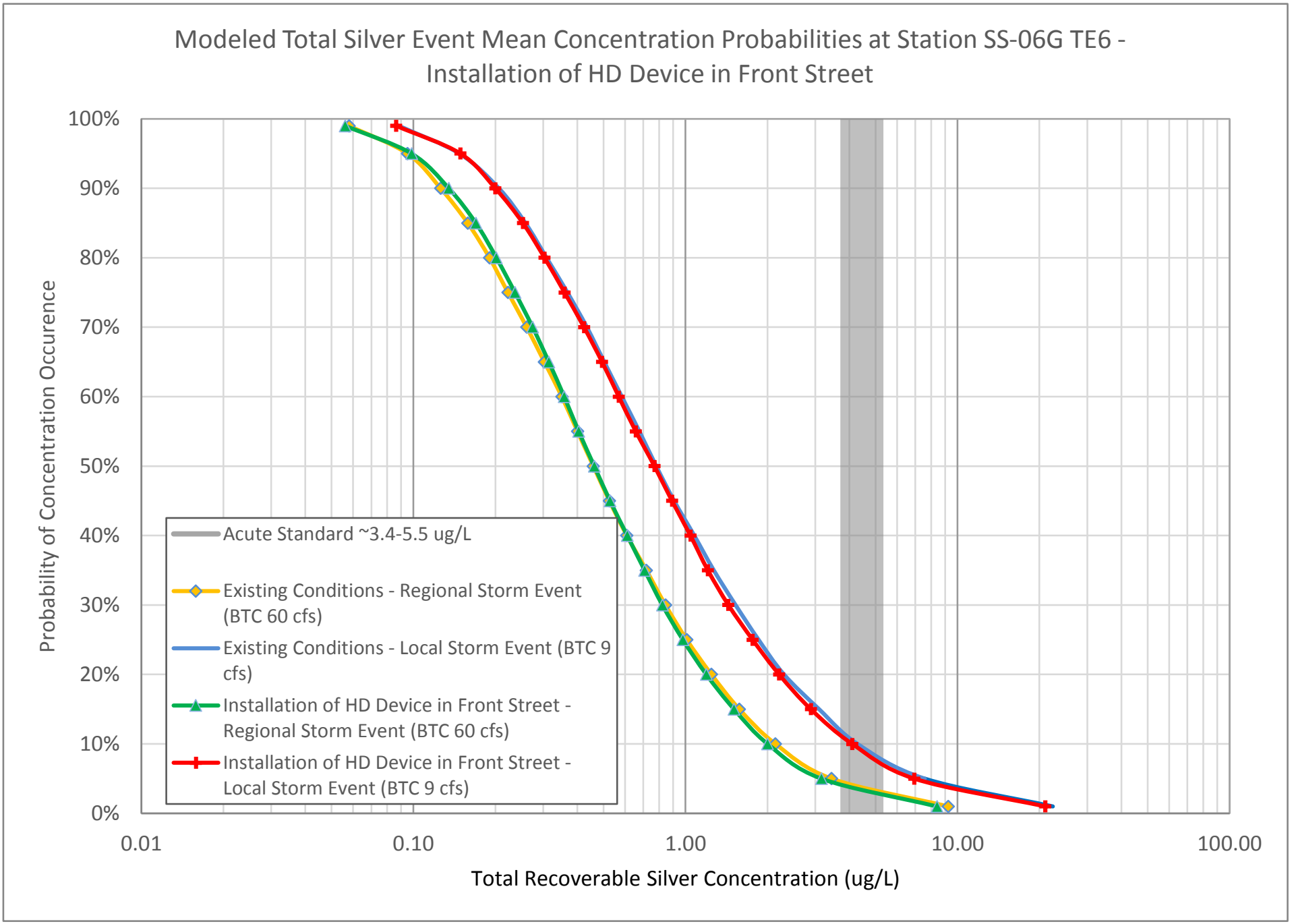


Figure E-40
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

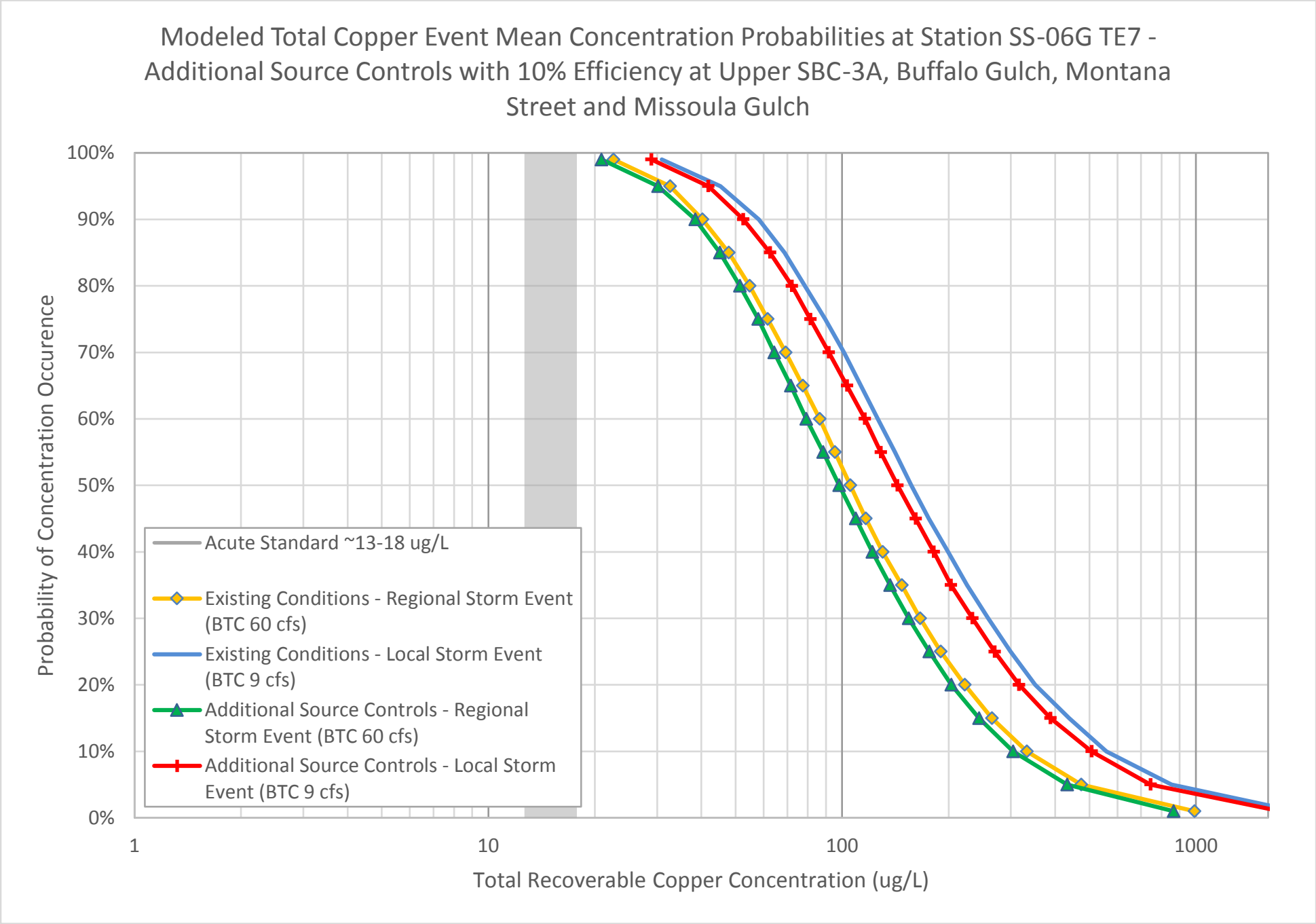


Figure E-41
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

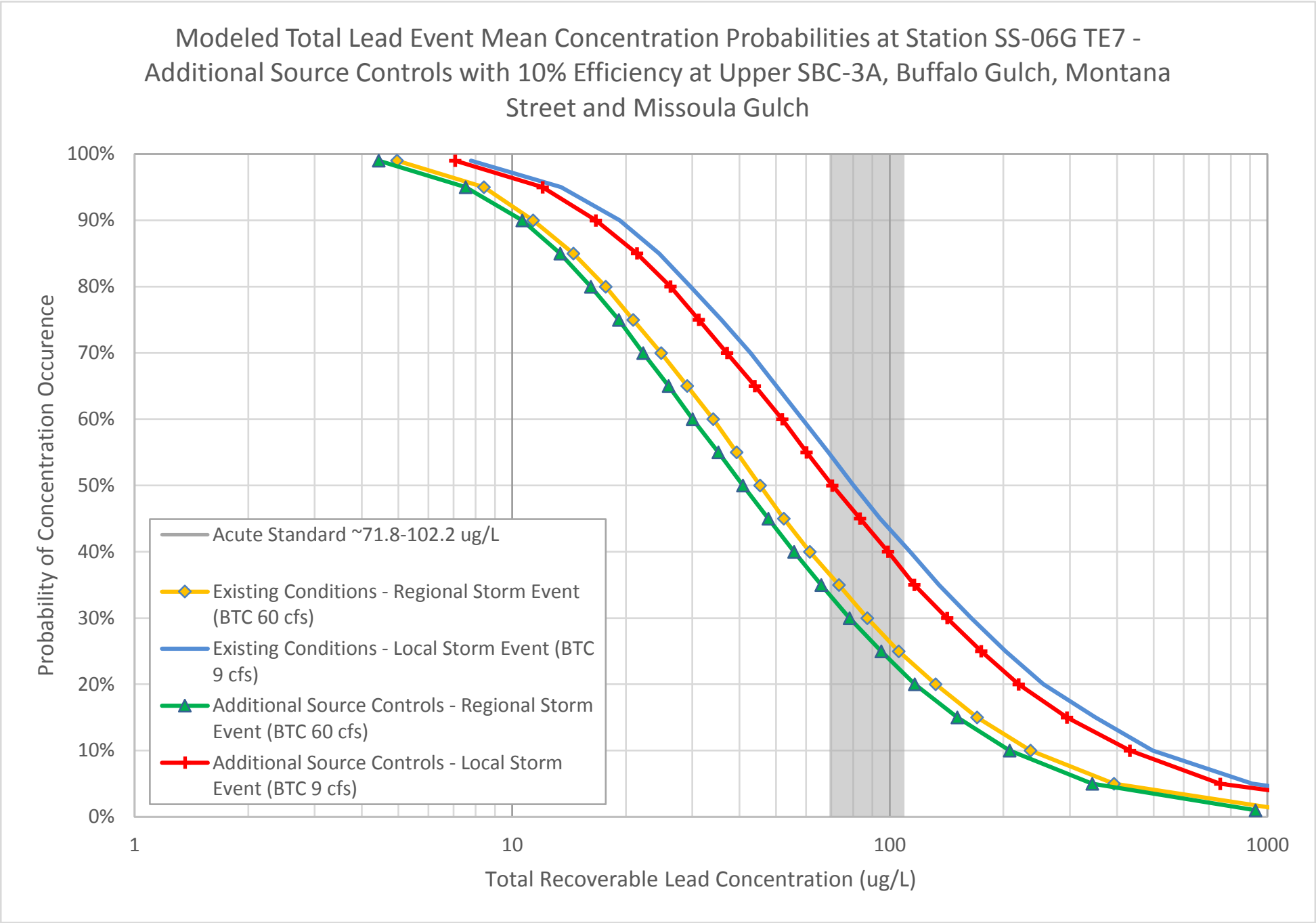


Figure E-42
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

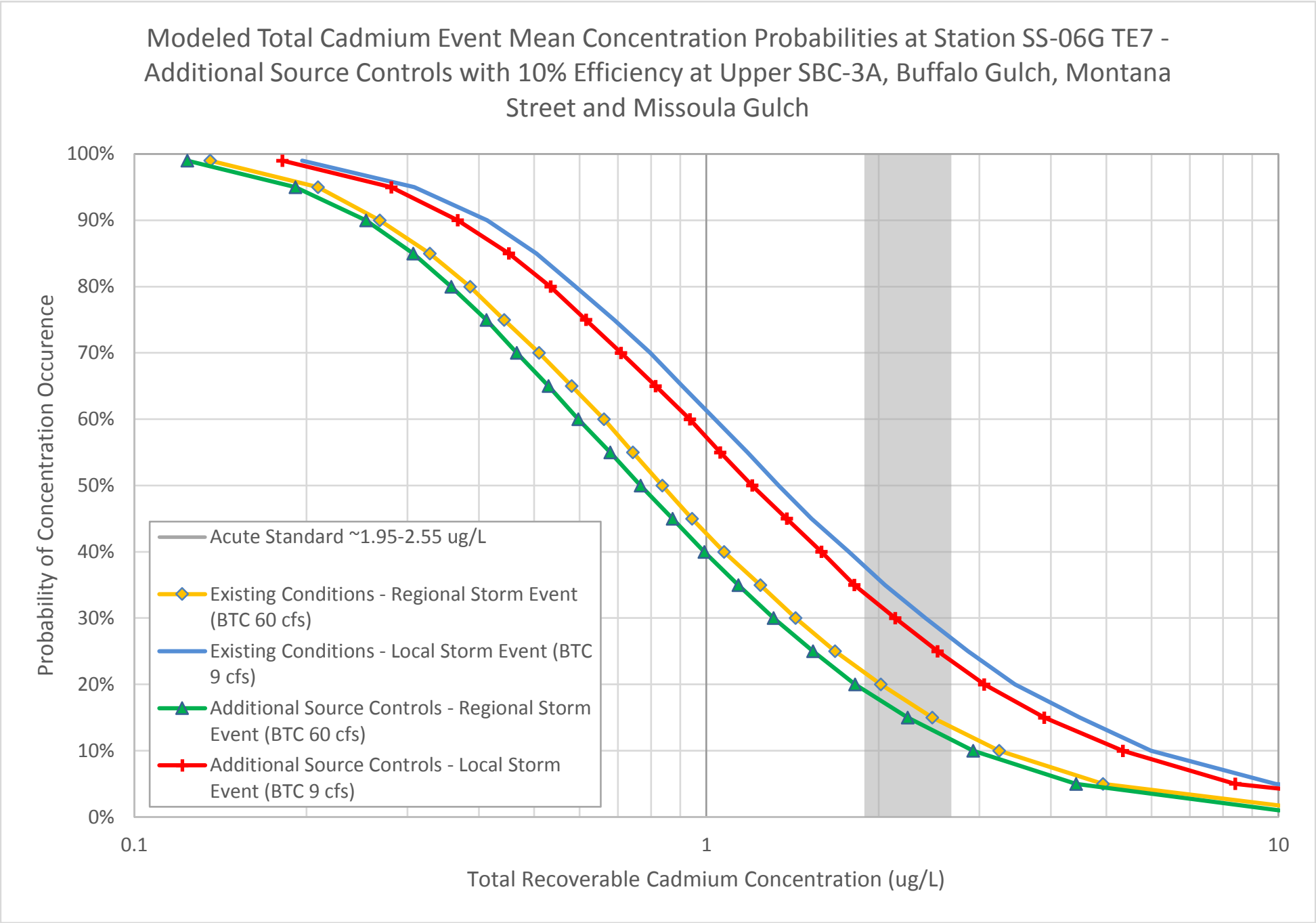


Figure E-43
Event Mean Concentration Results

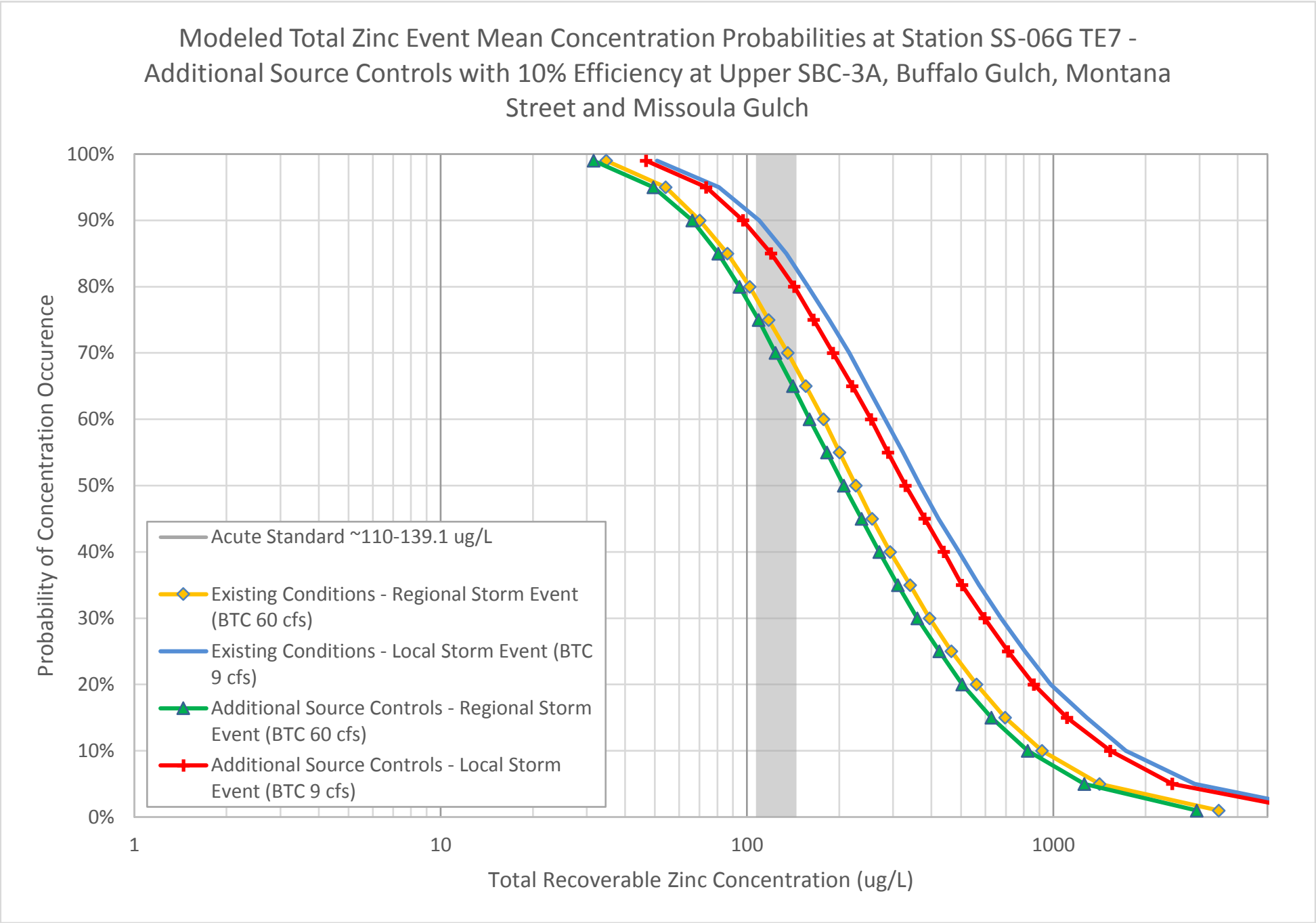


Figure E-44
Event Mean Concentration Results

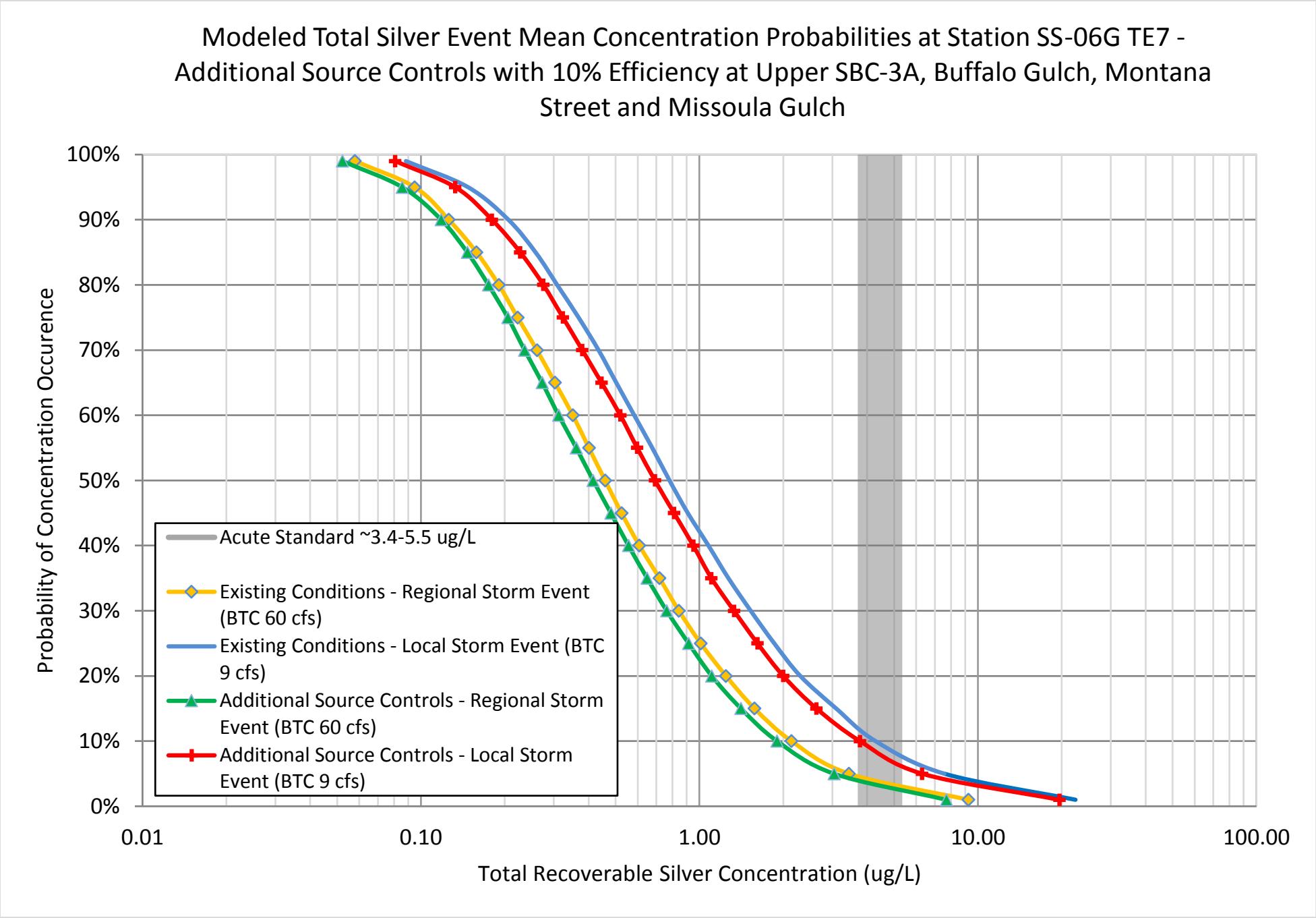


Figure E-45
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

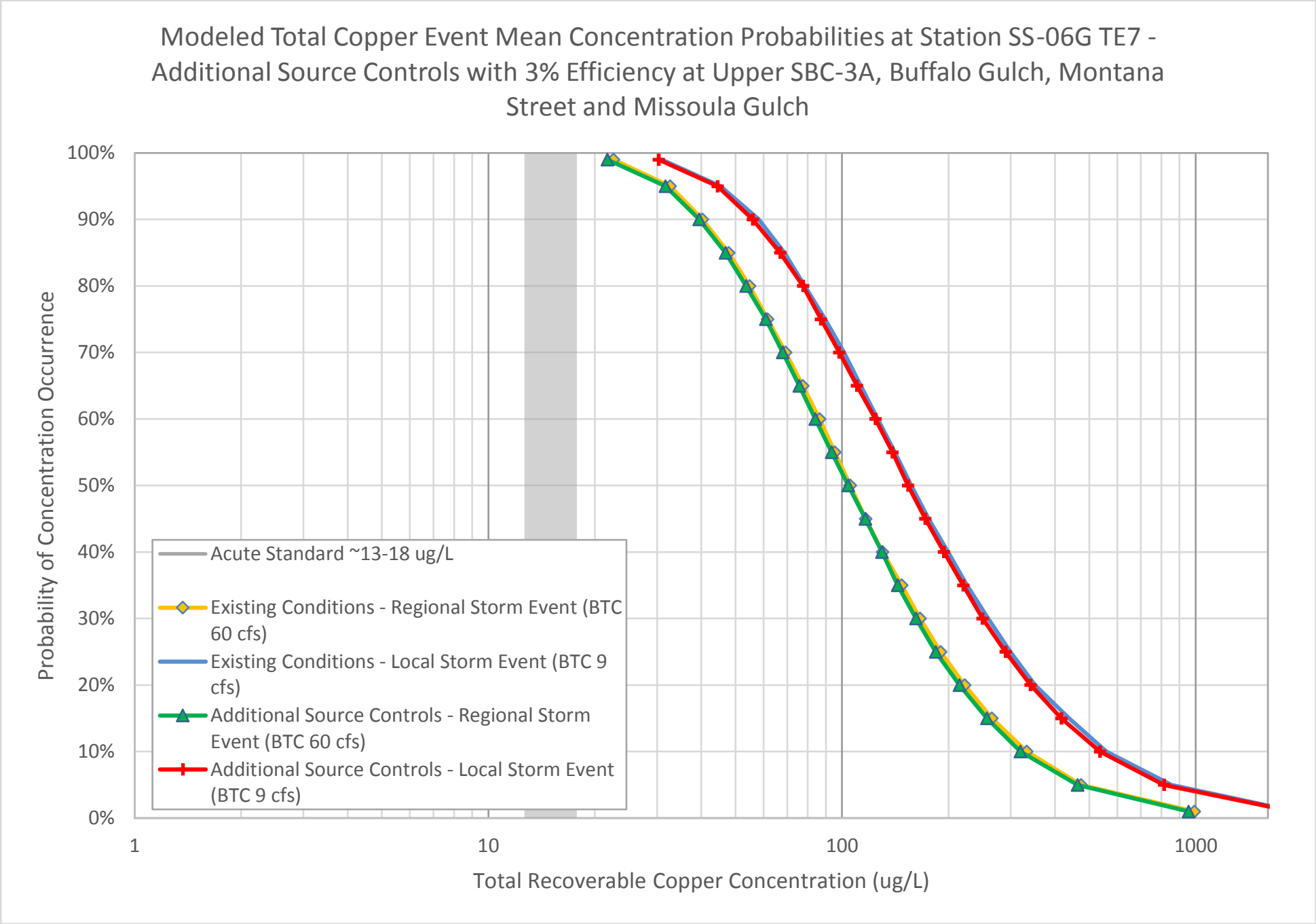


Figure E-46
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

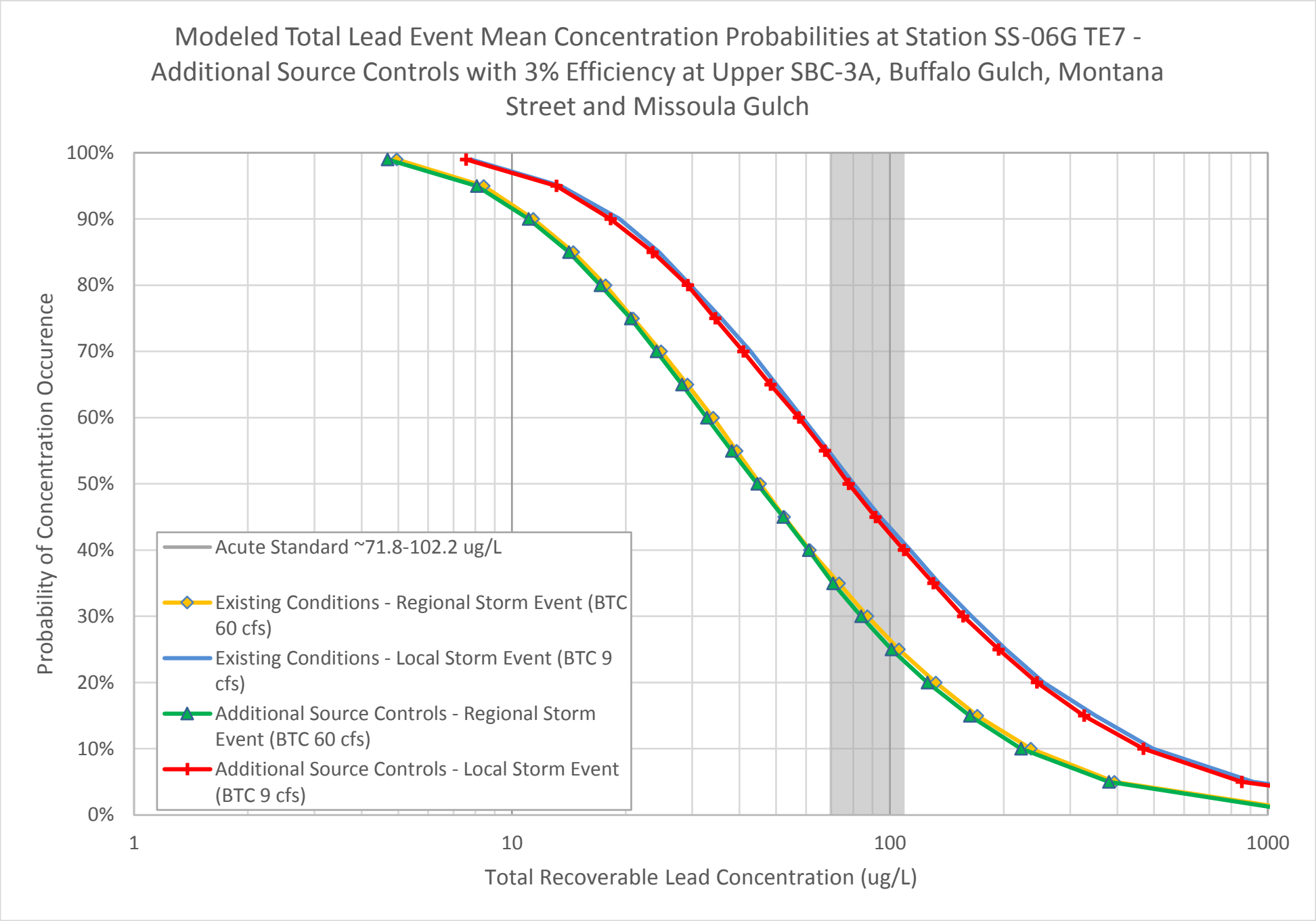


Figure E-47
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

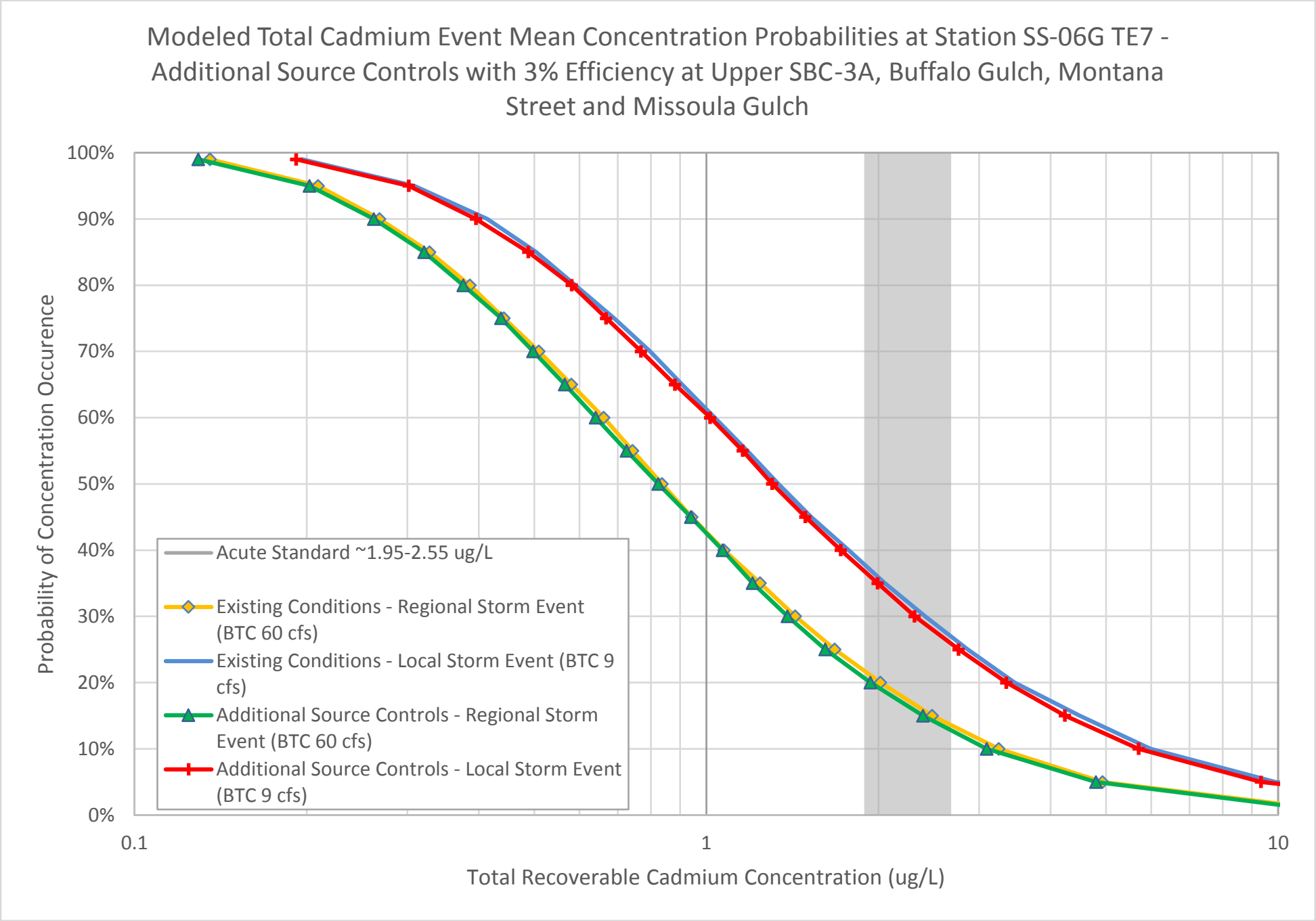


Figure E-48
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

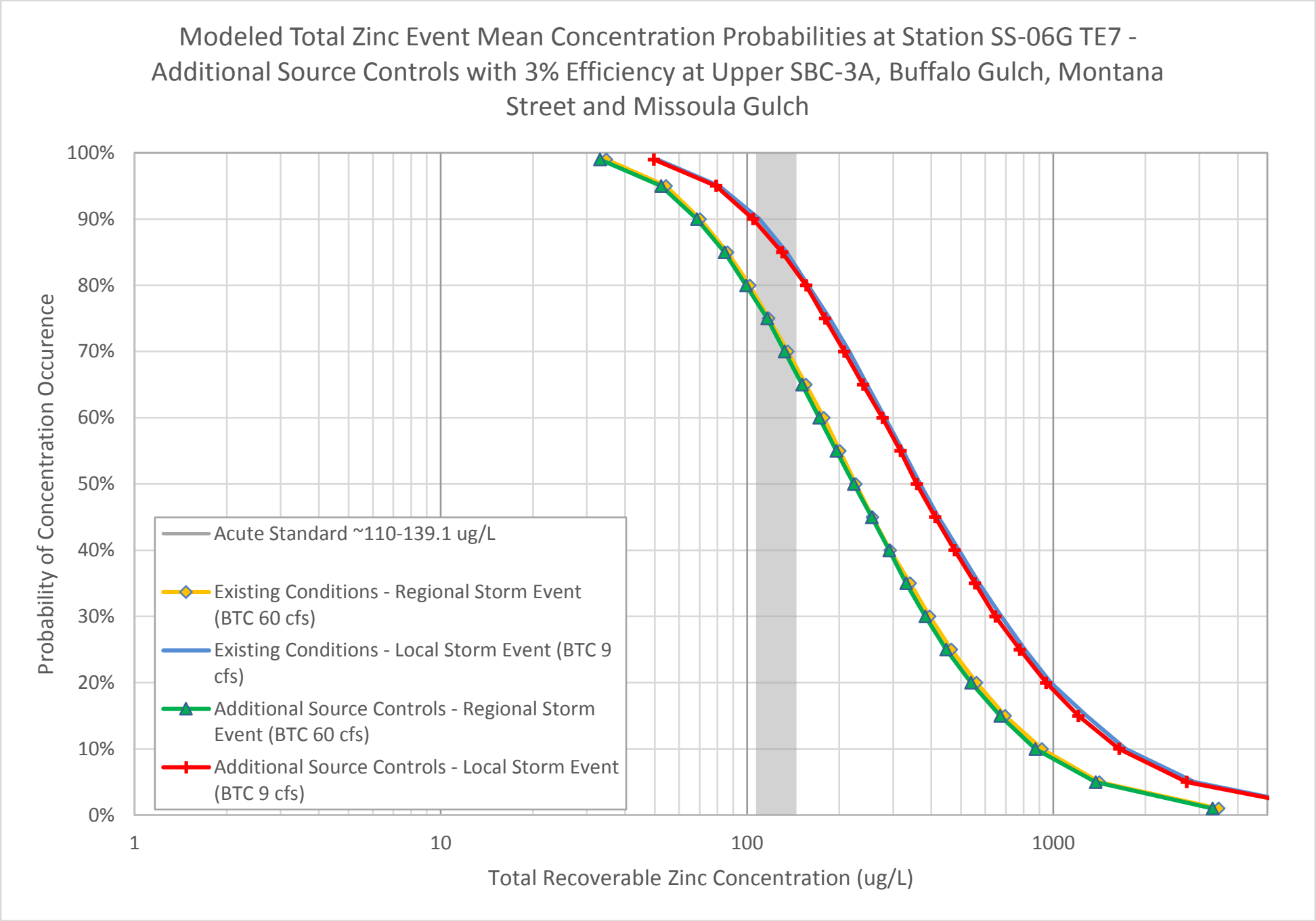


Figure E-49
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

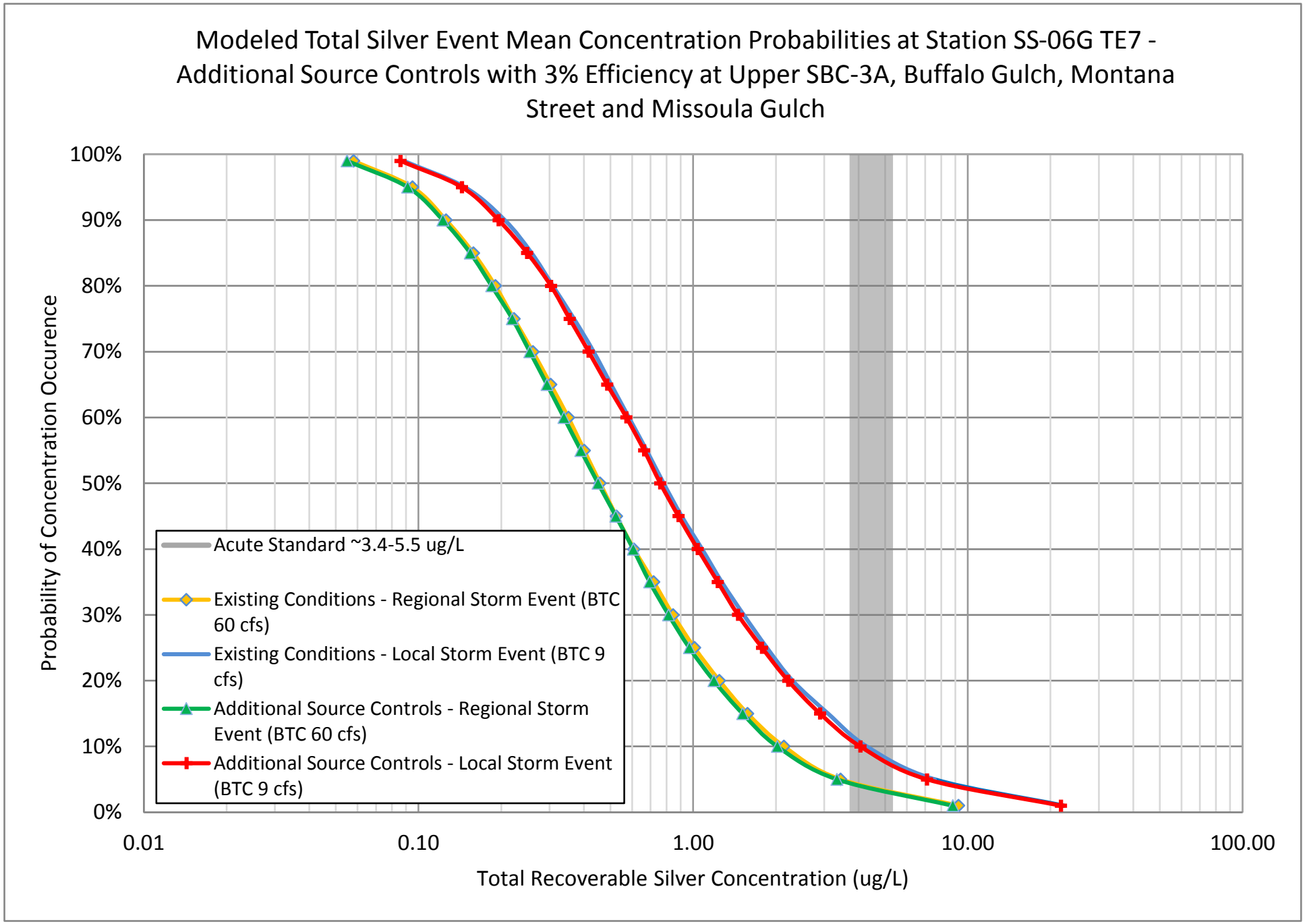


Figure E-50
Event Mean Concentration Results

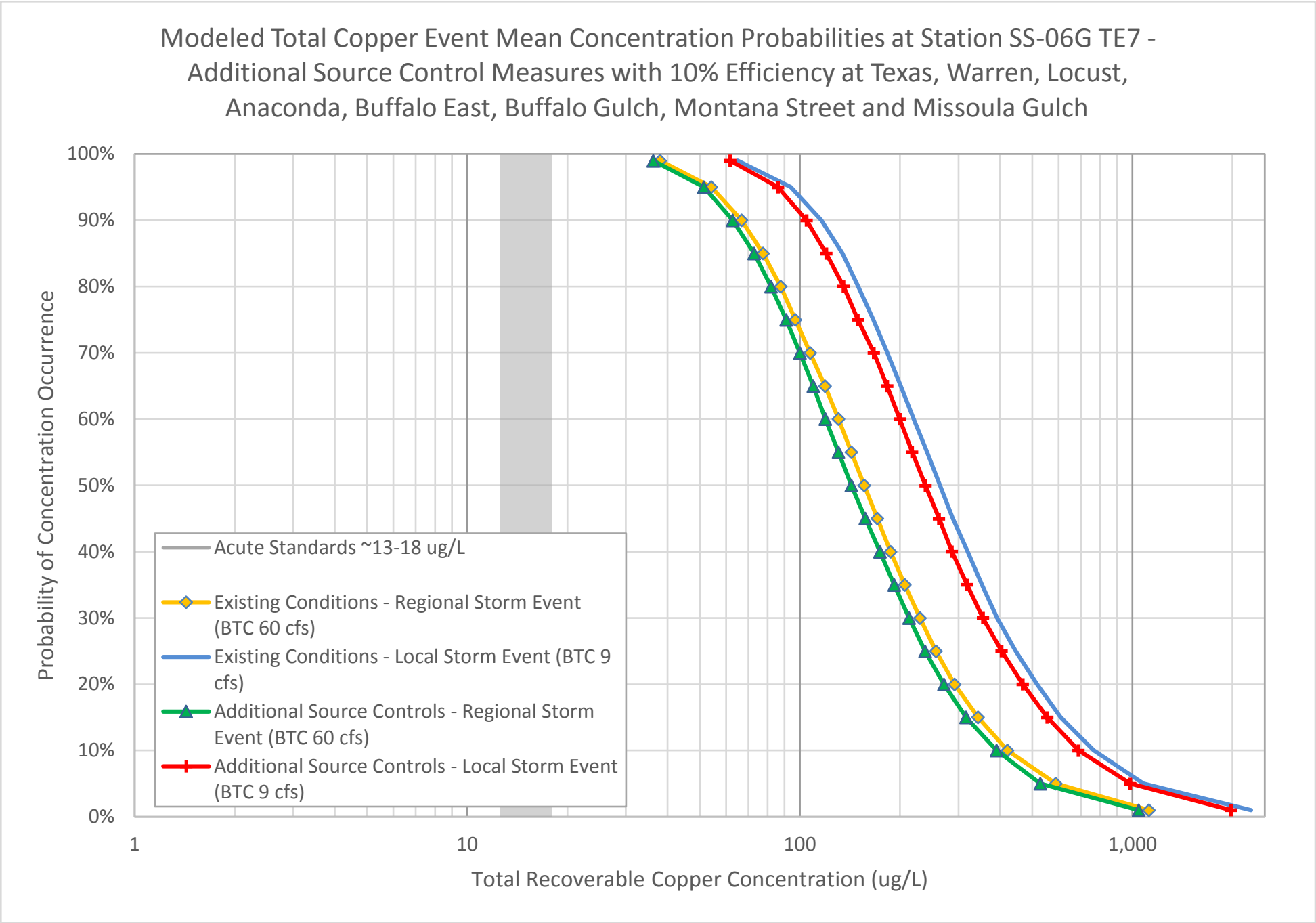


Figure E-51
Event Mean Concentration Results

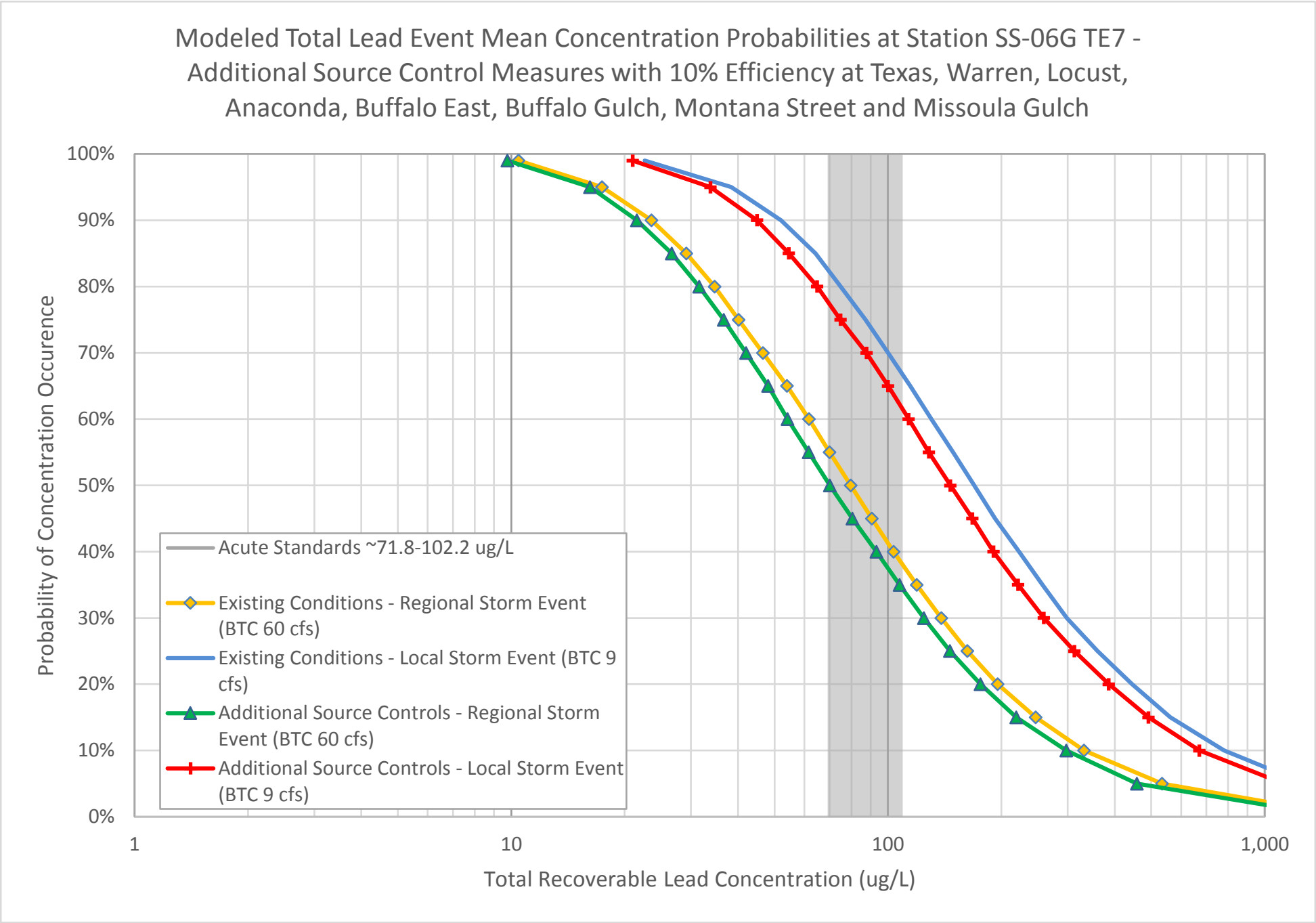


Figure E-52
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

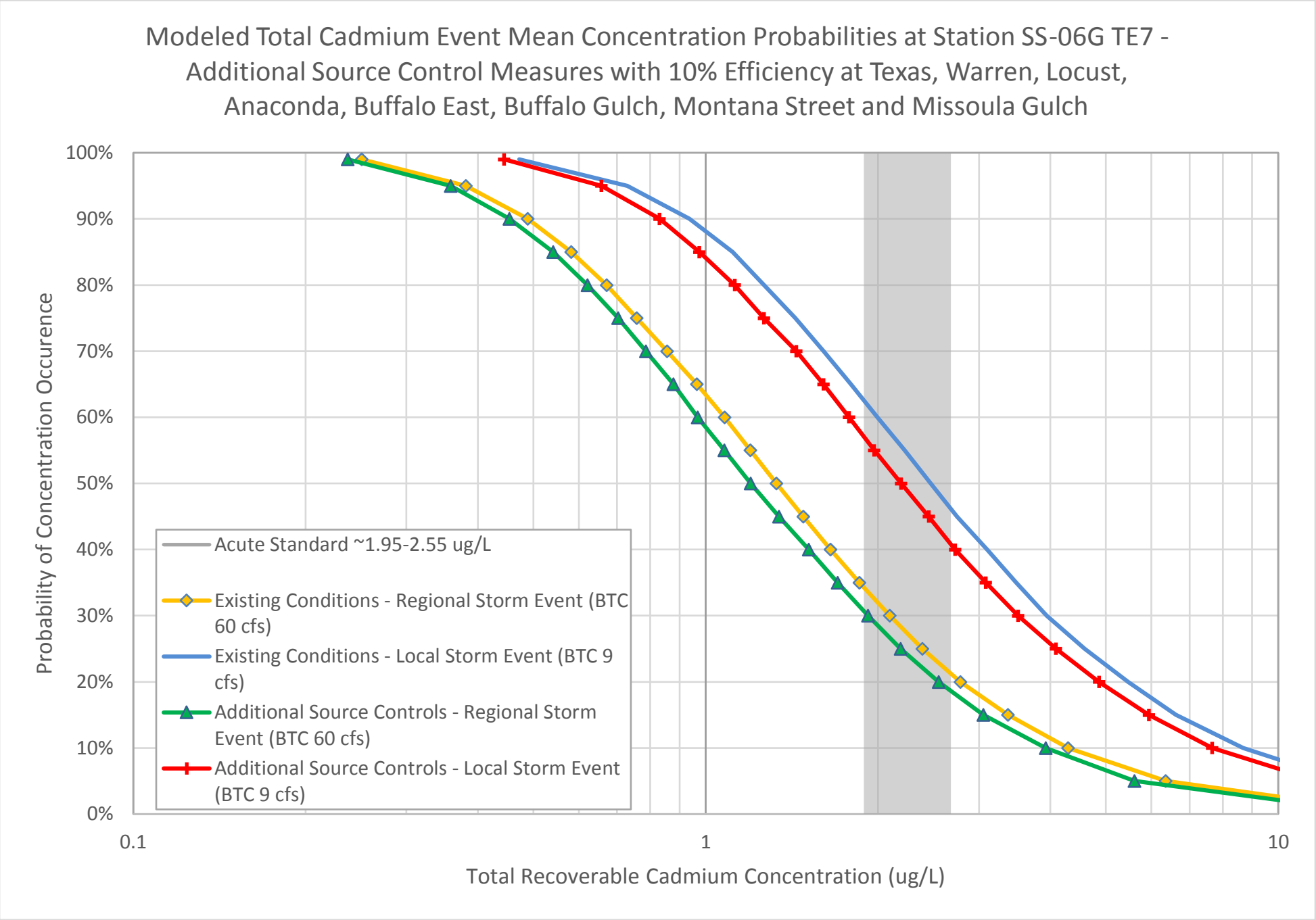


Figure E-53
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

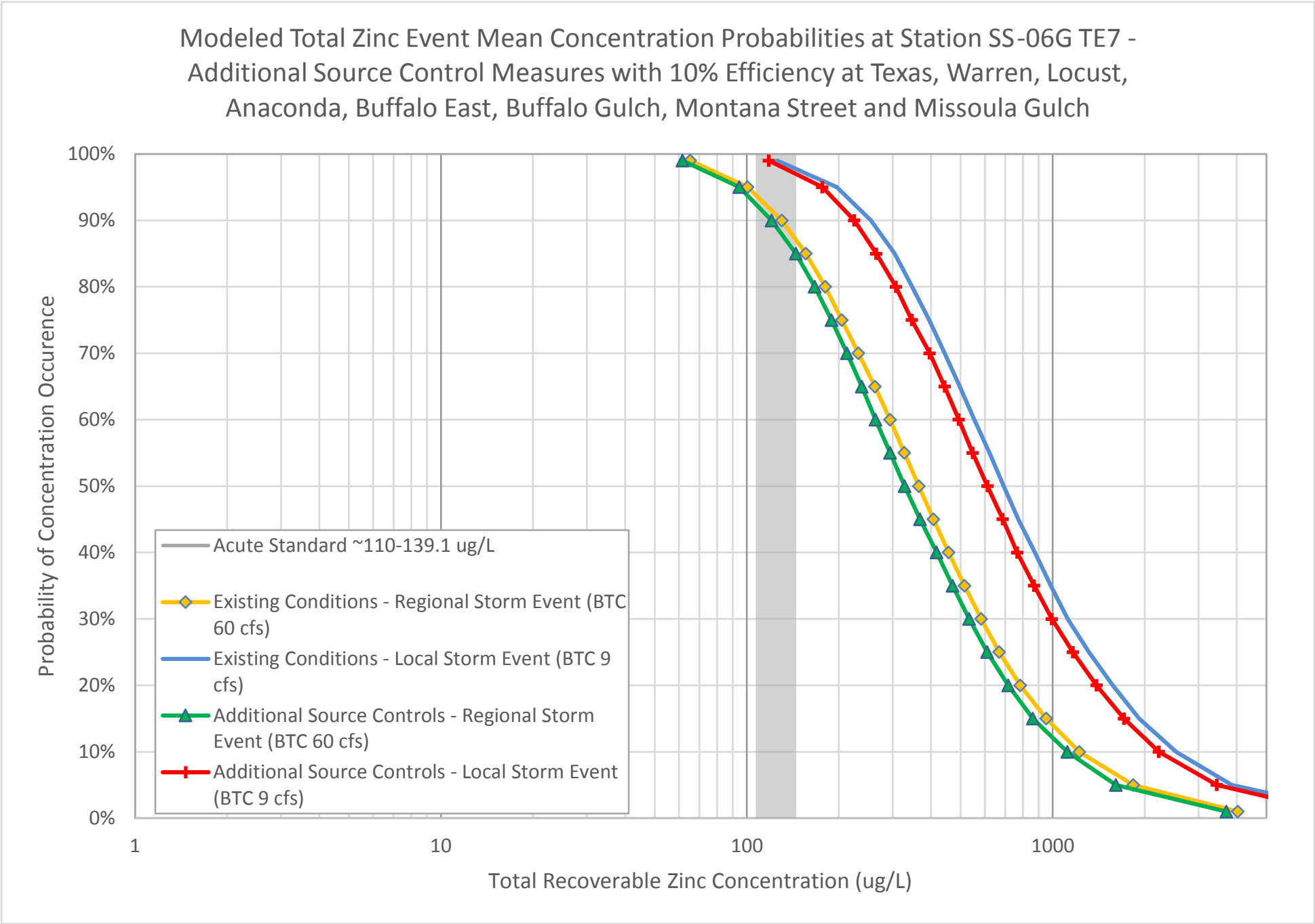


Figure E-54
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

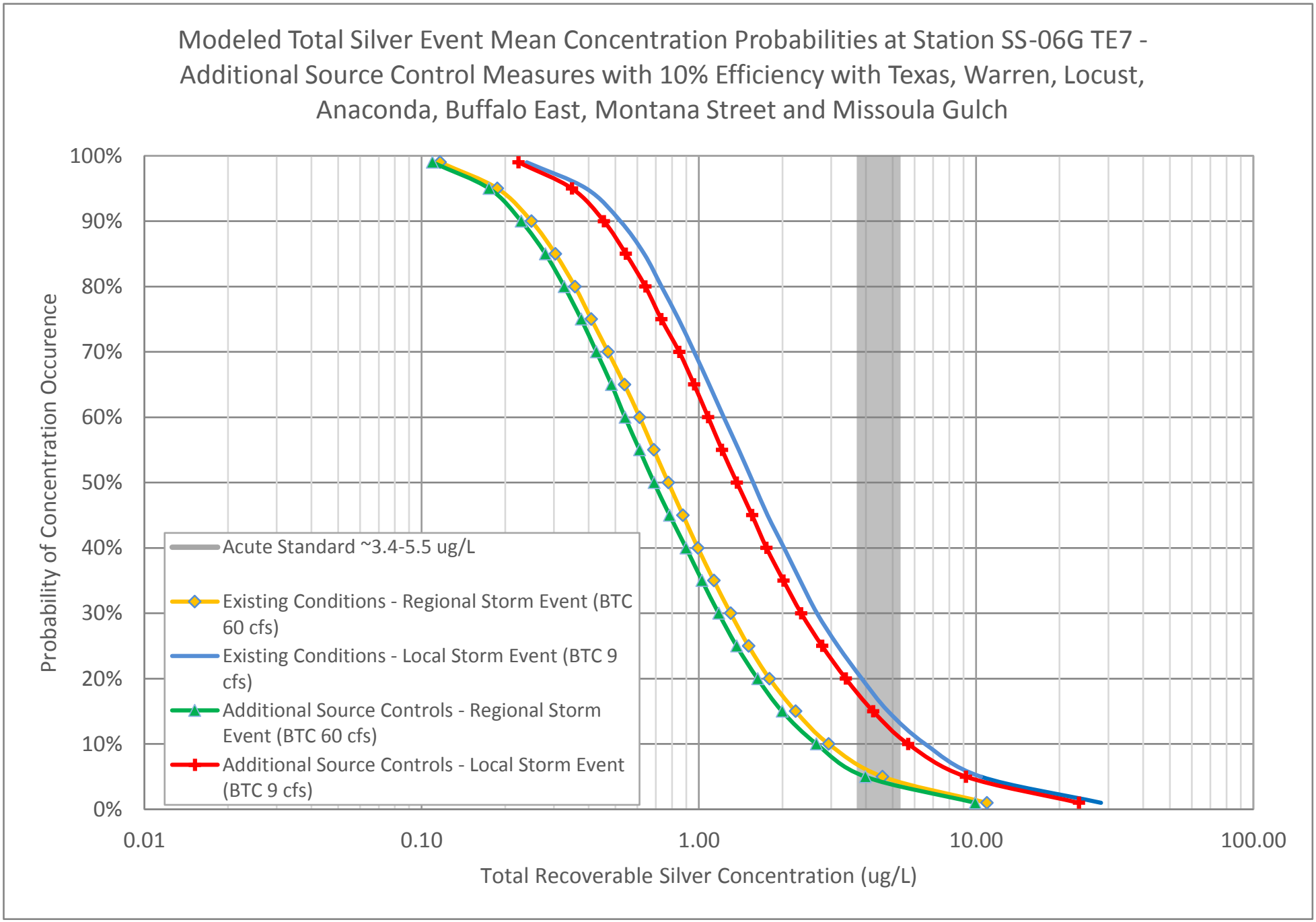


Figure E-55
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

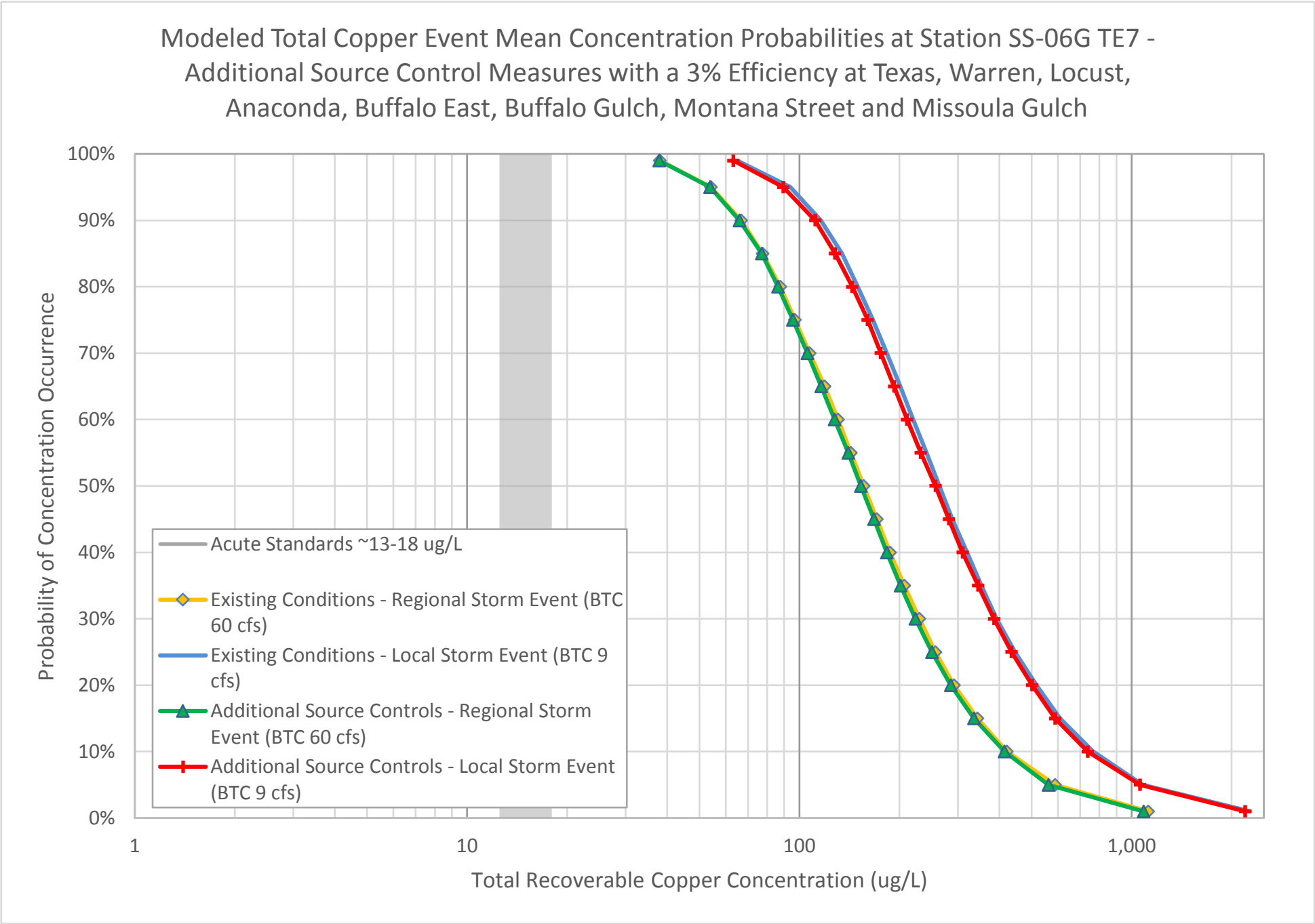


Figure E-56
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

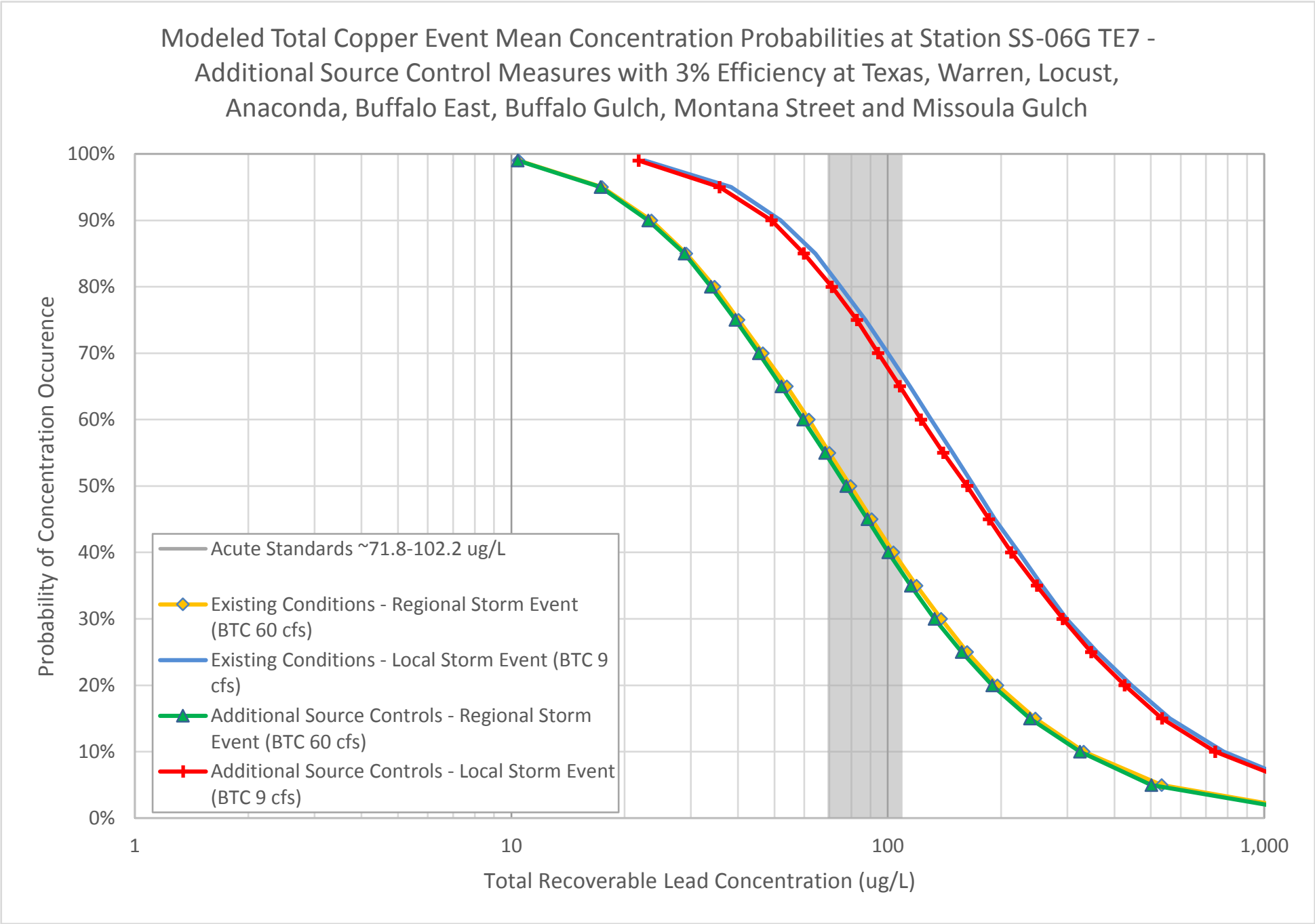


Figure E-57
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

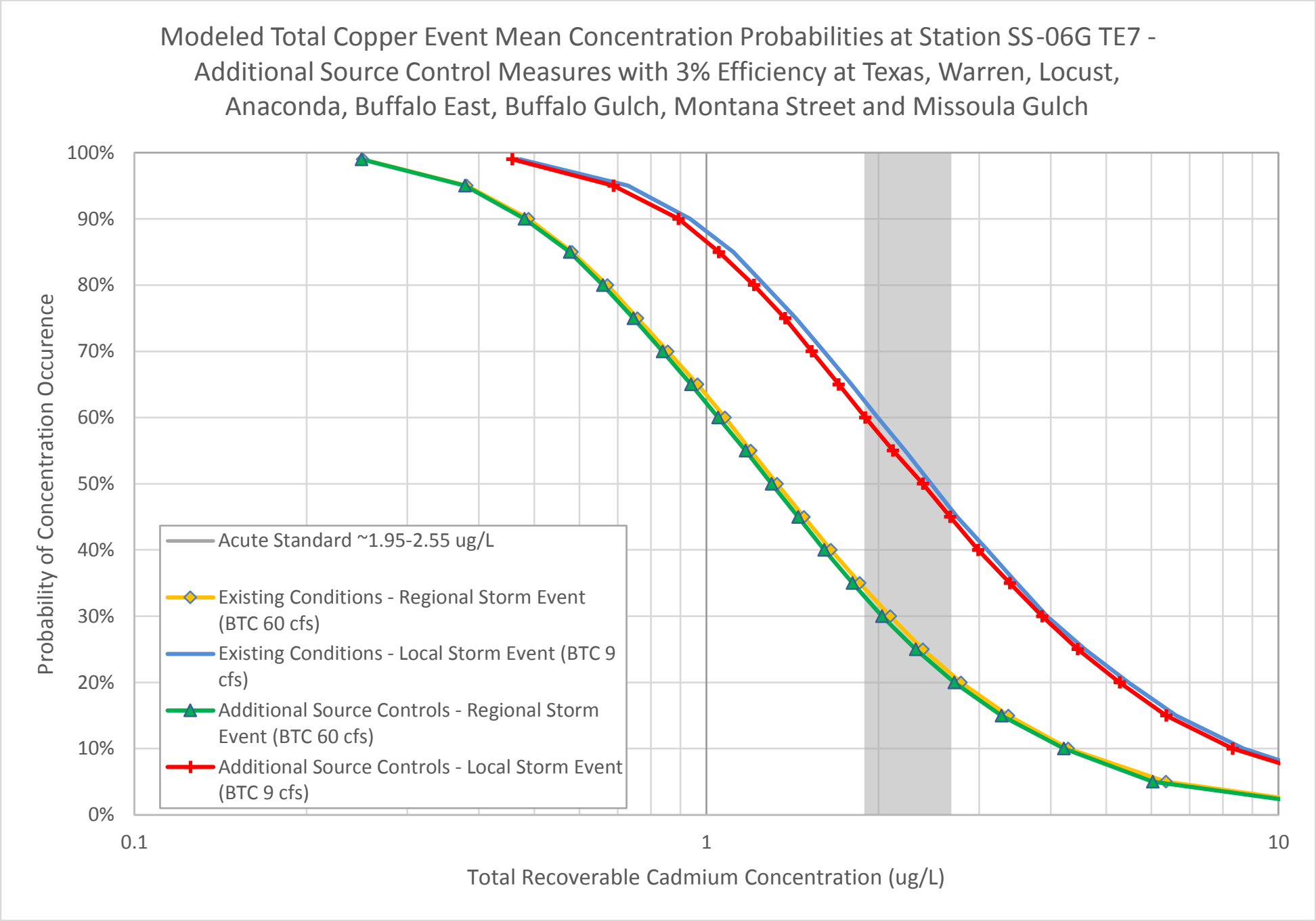


Figure E-58
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

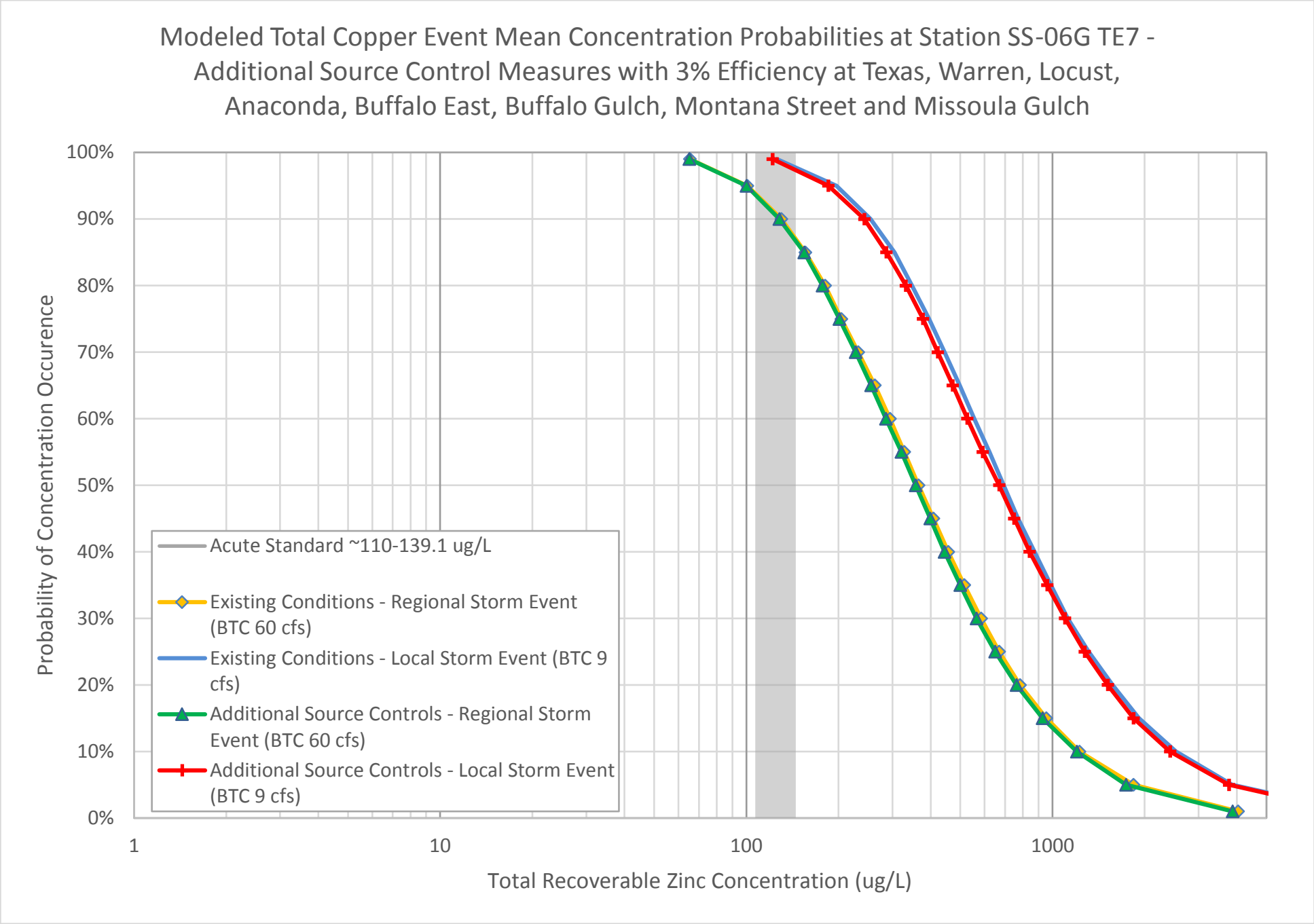


Figure E-59
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

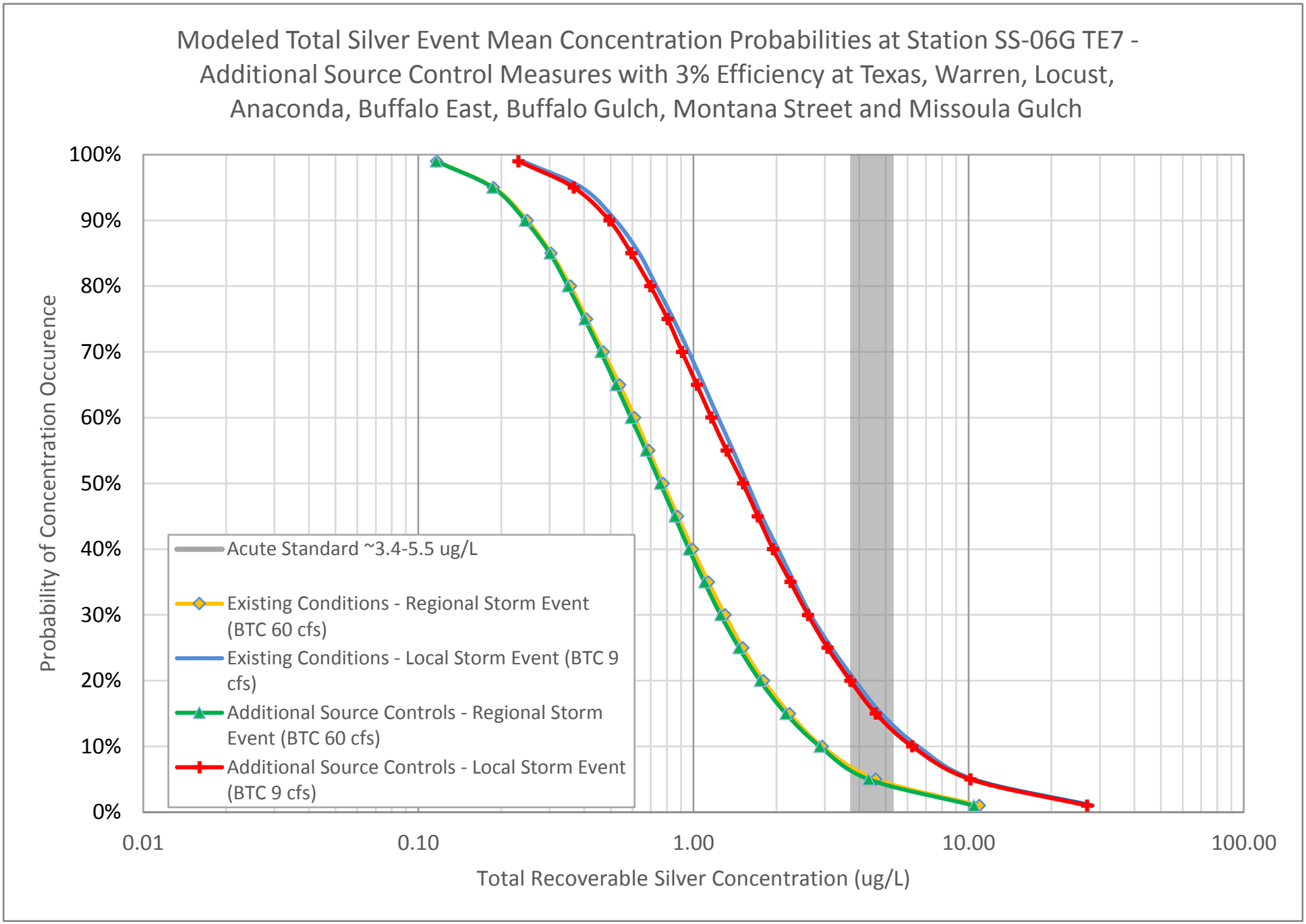


Figure E-60
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

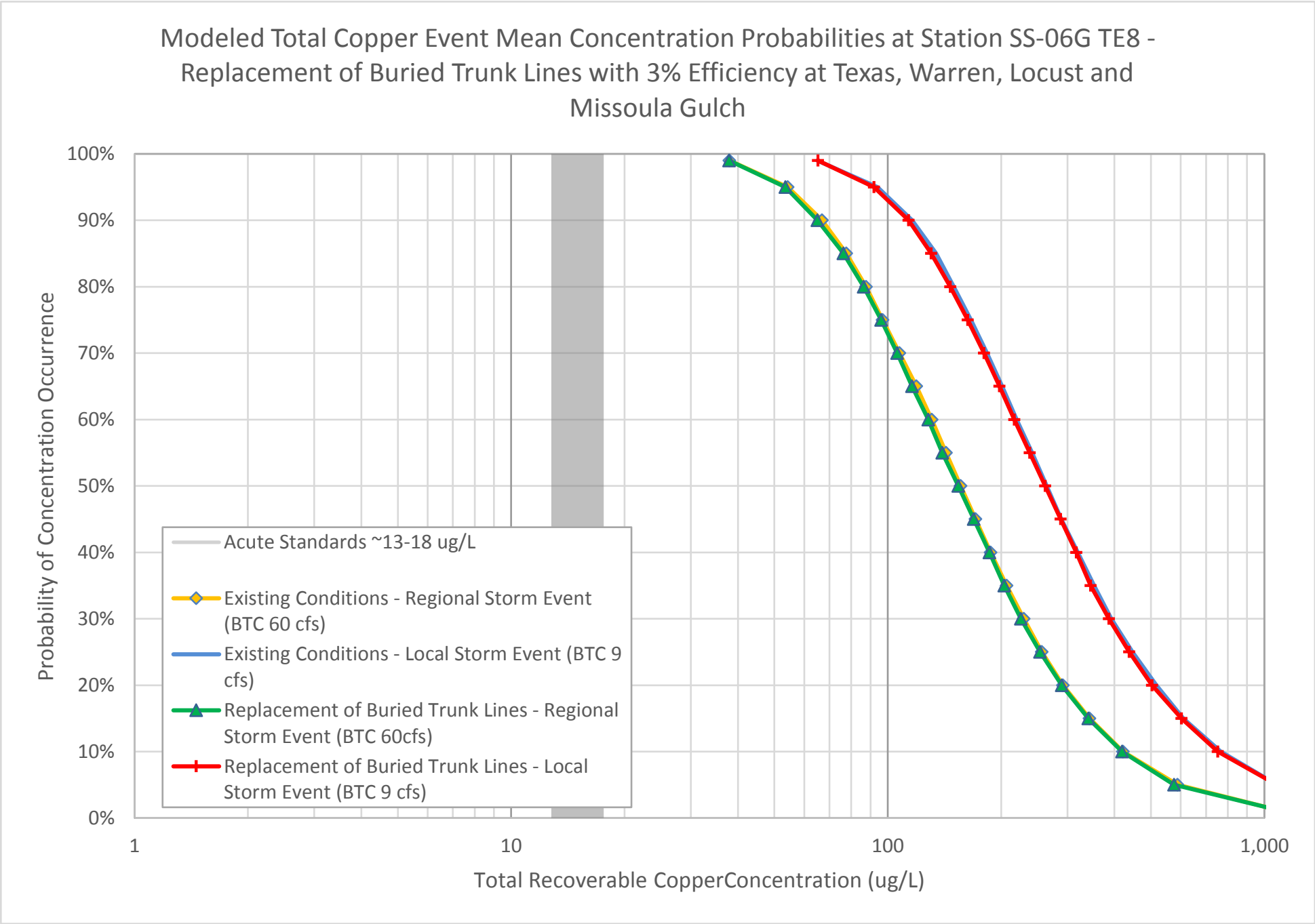


Figure E-61
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

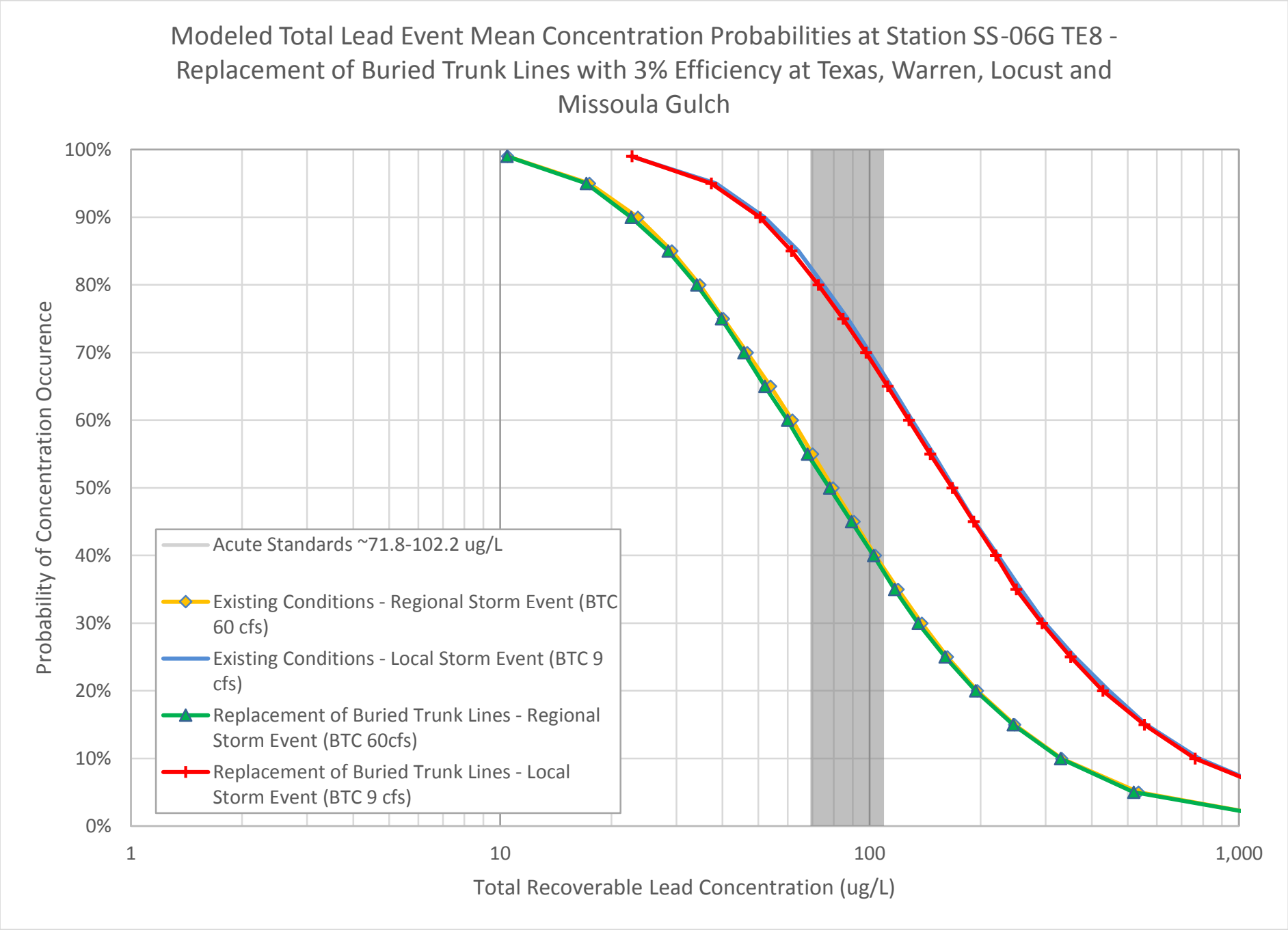


Figure E-62
Event Mean Concentration Results

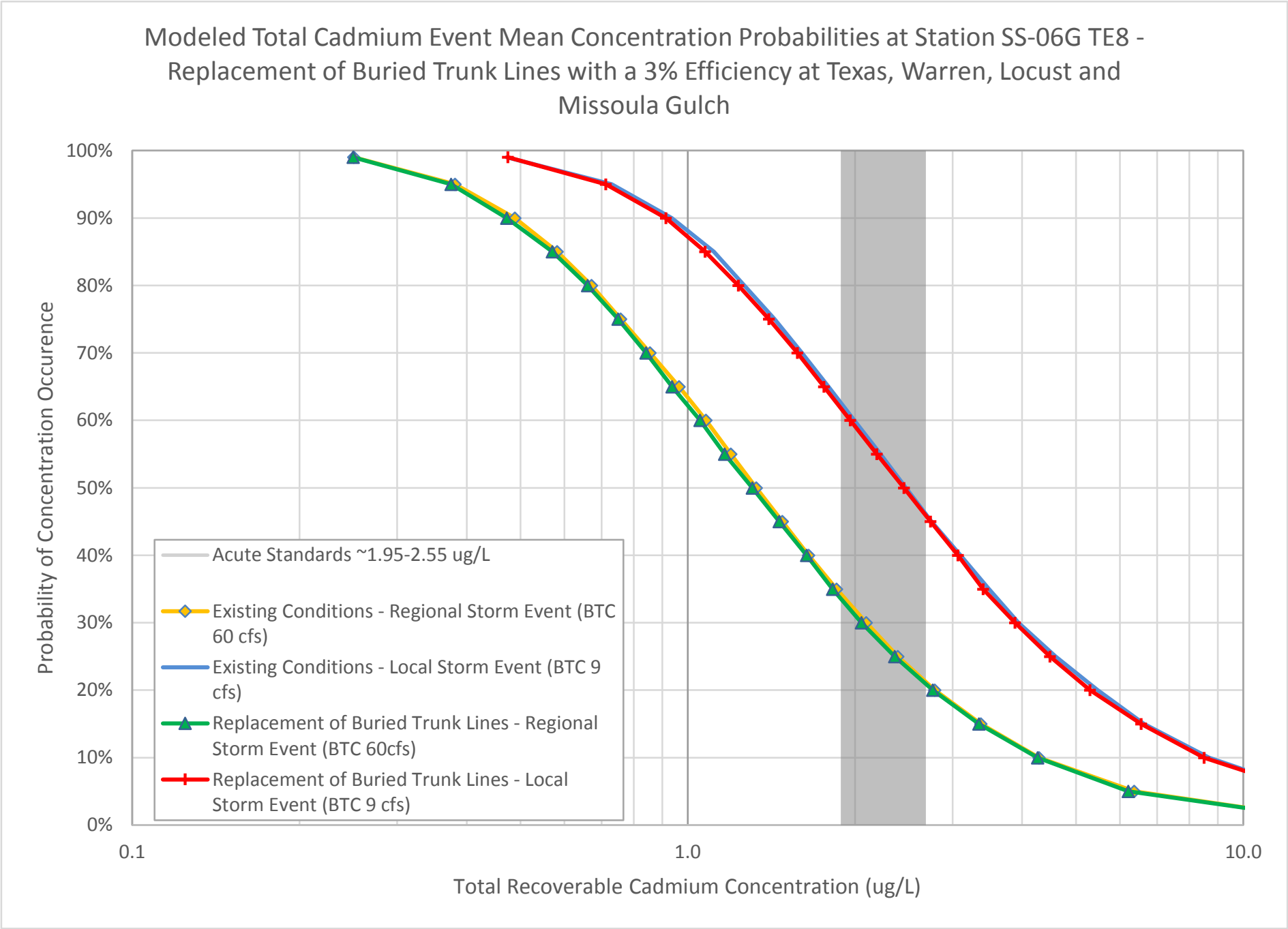


Figure E-63
Event Mean Concentration Results

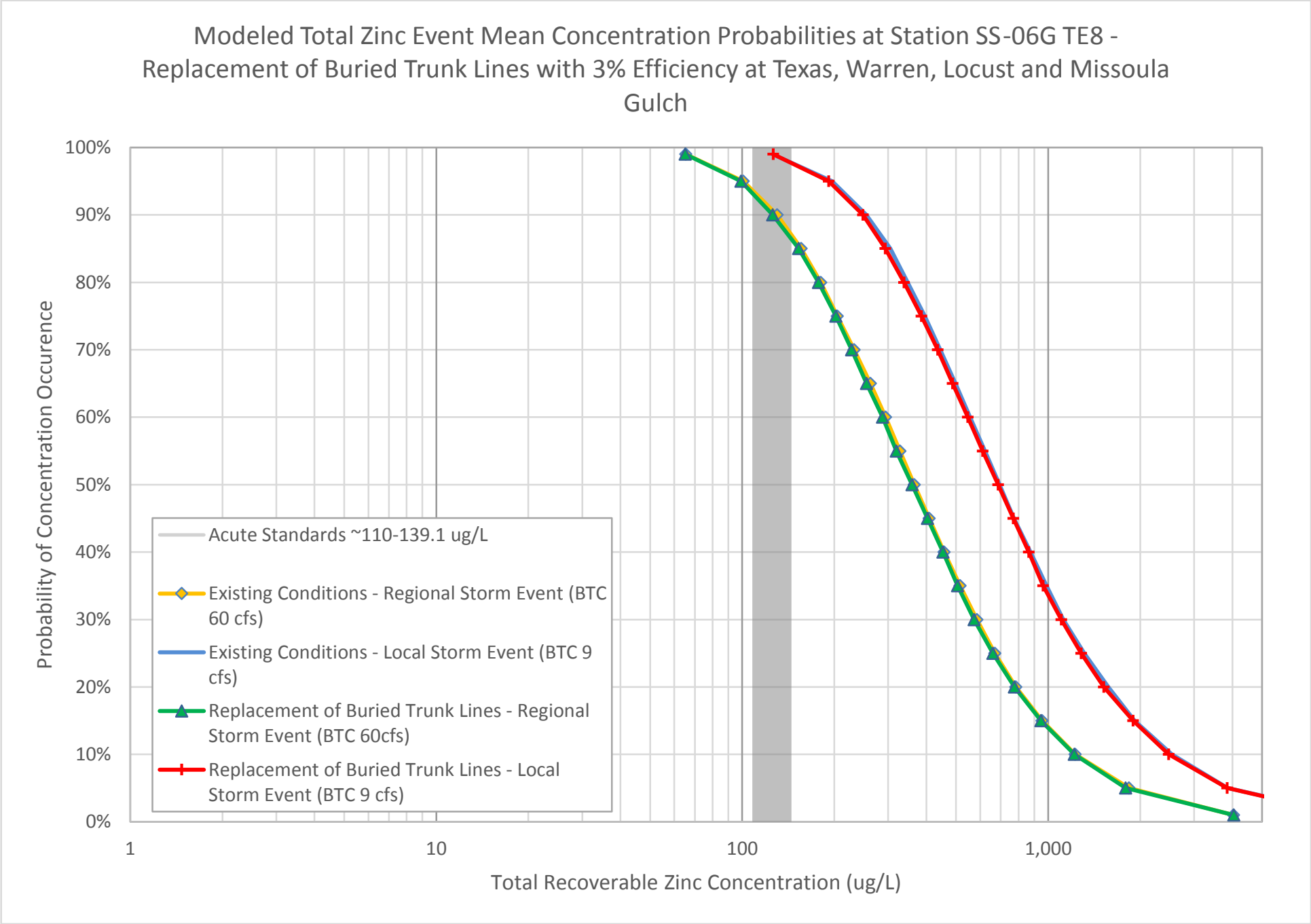


Figure E-64
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

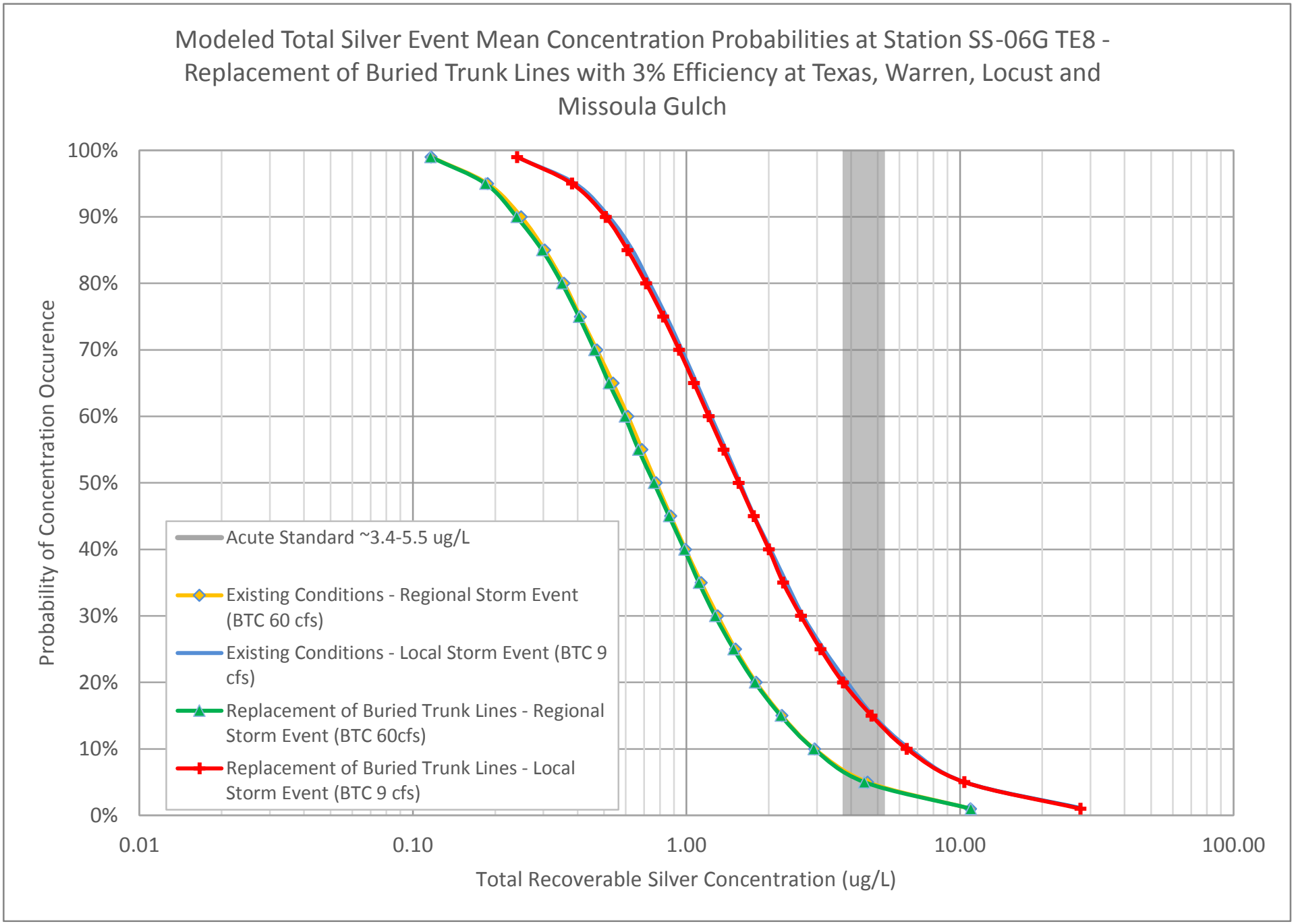


Figure E-65
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

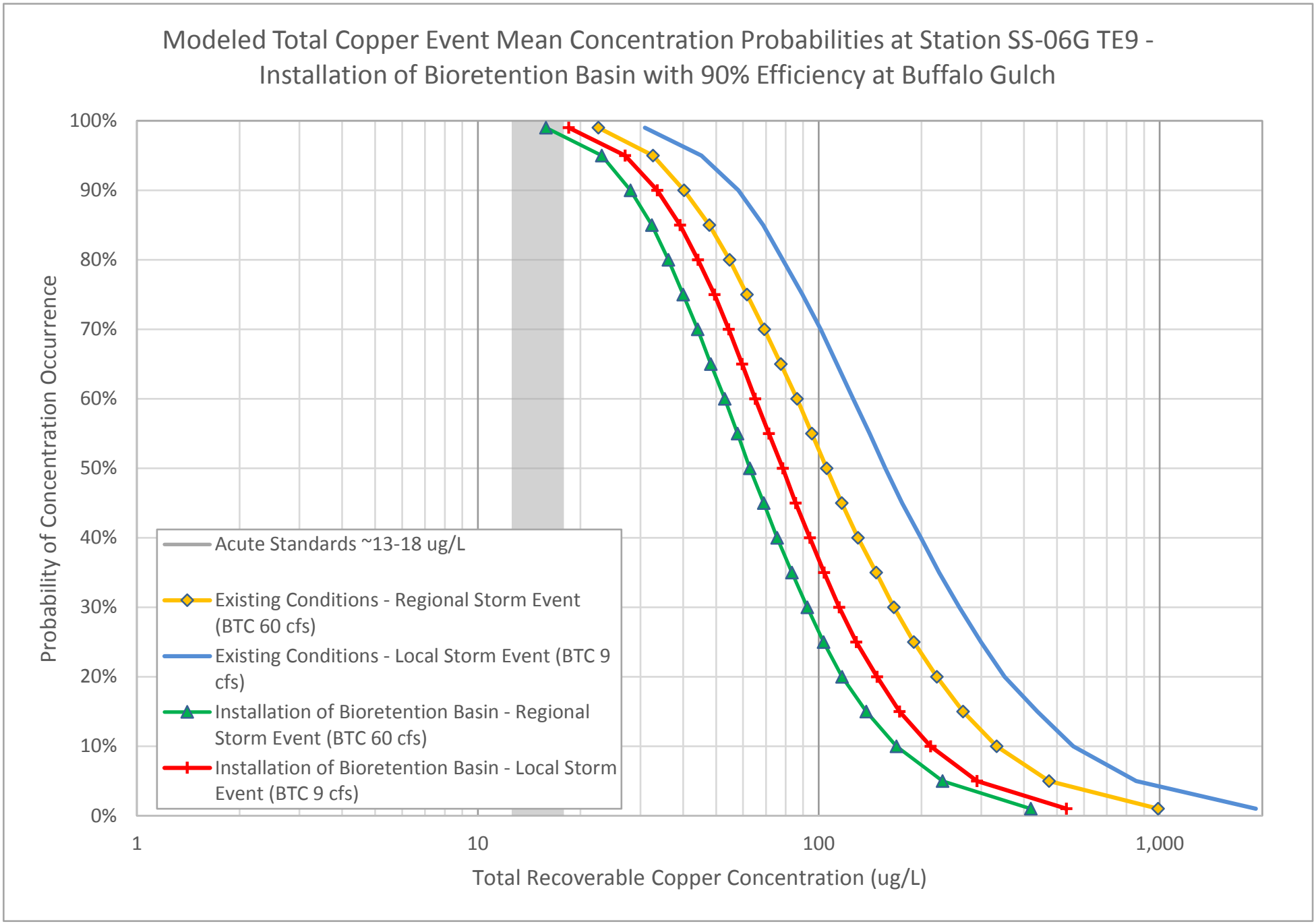


Figure E-66
Event Mean Concentration Results

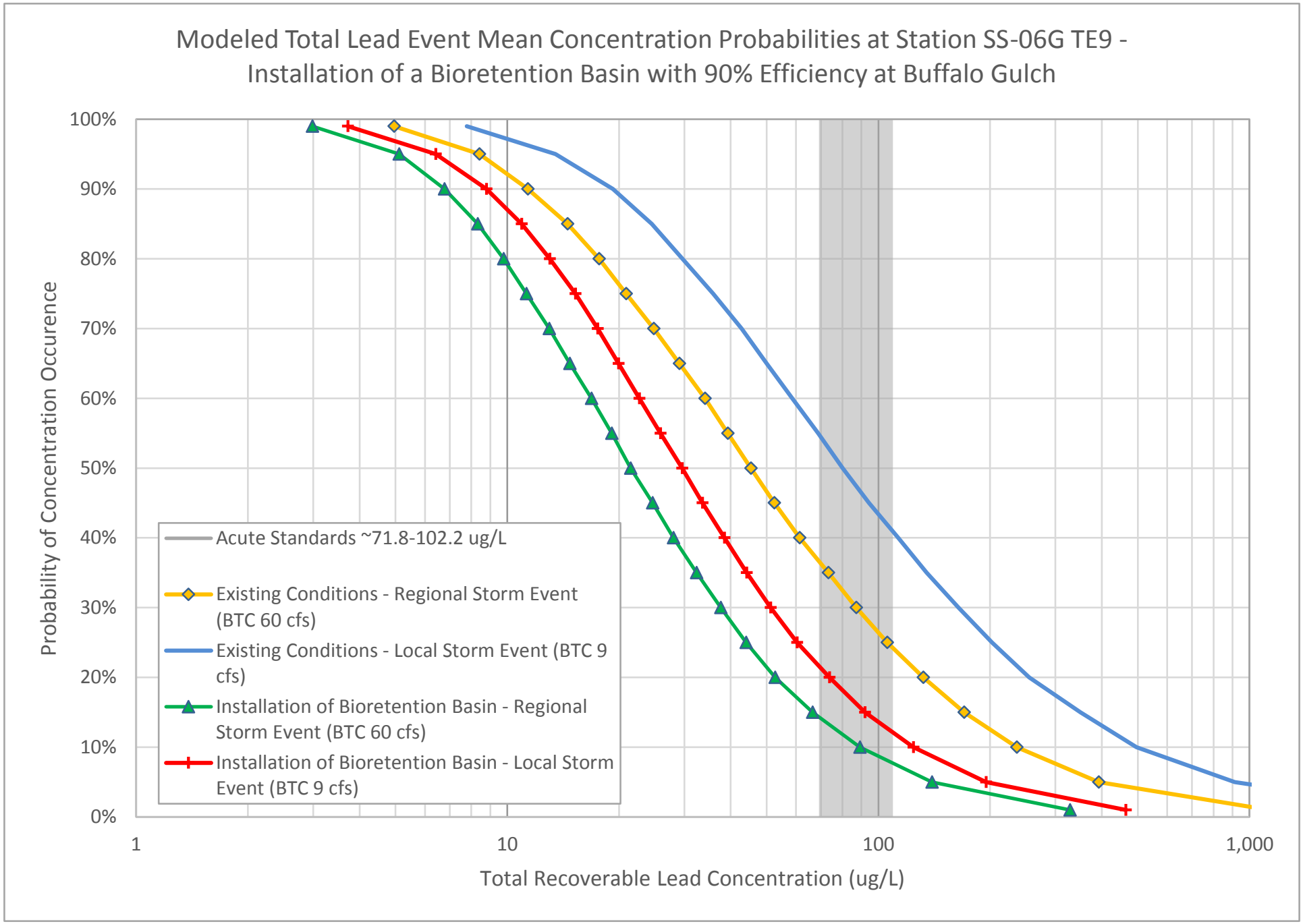


Figure E-67
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

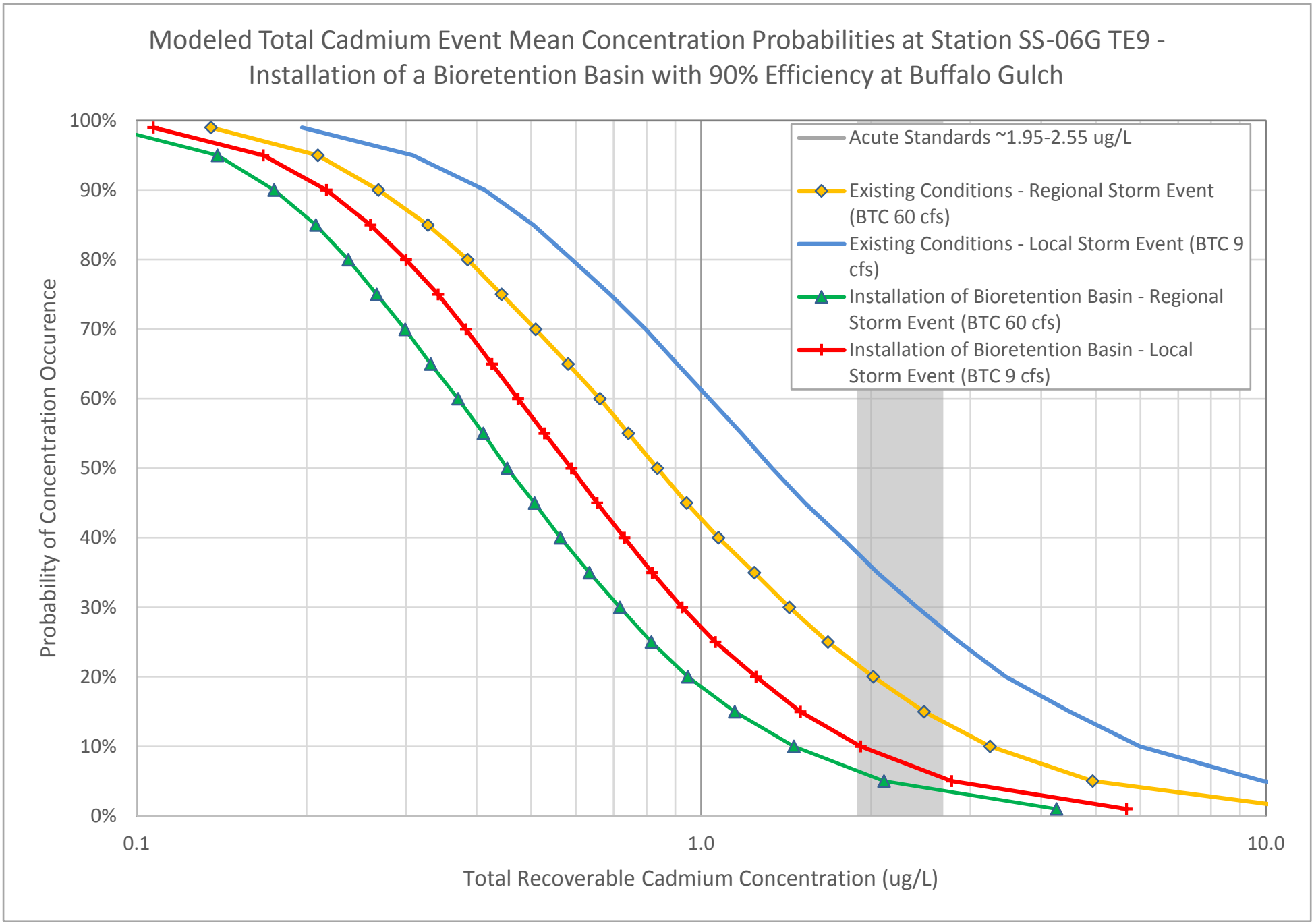


Figure E-68
Event Mean Concentration Results

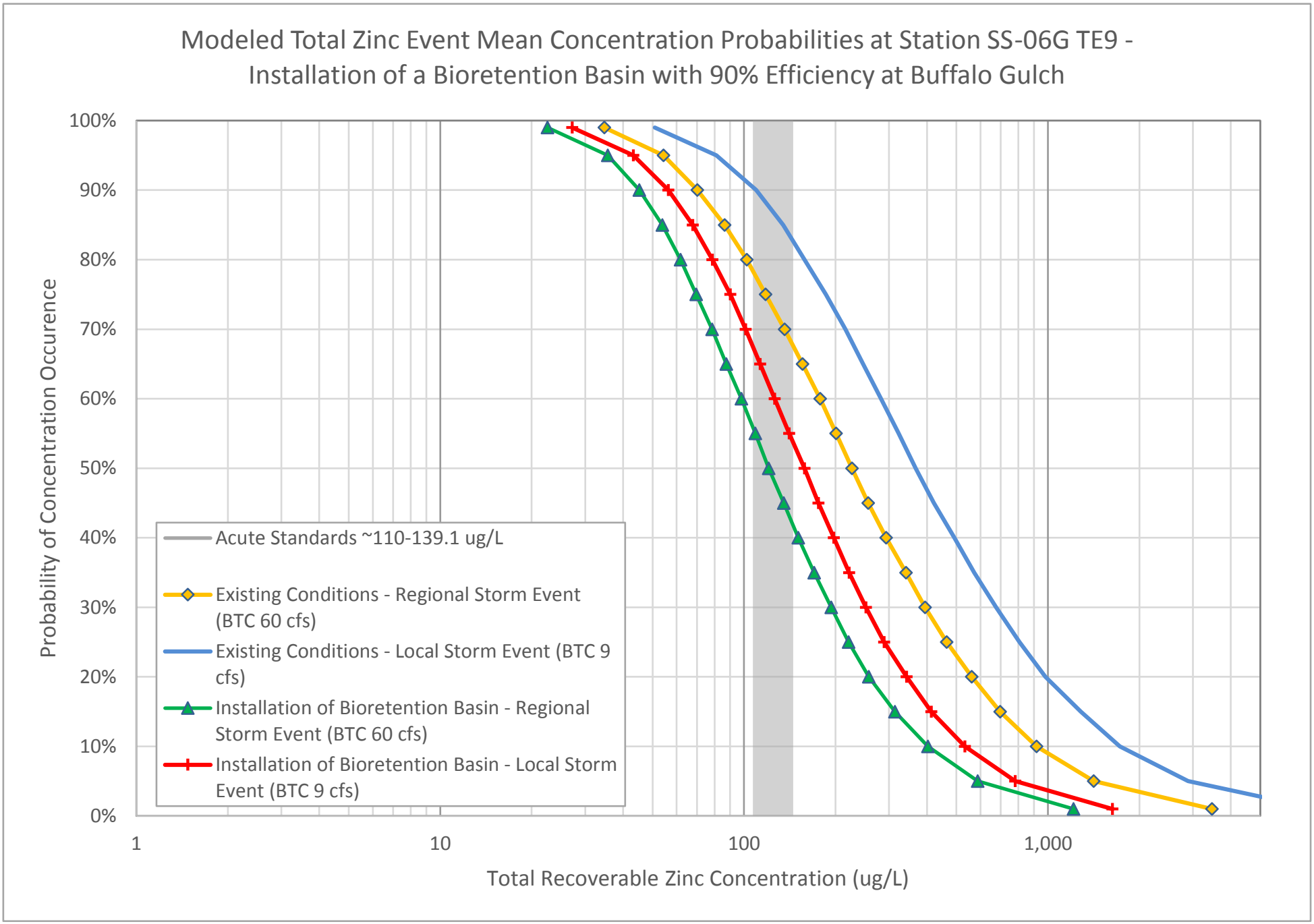


Figure E-69
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

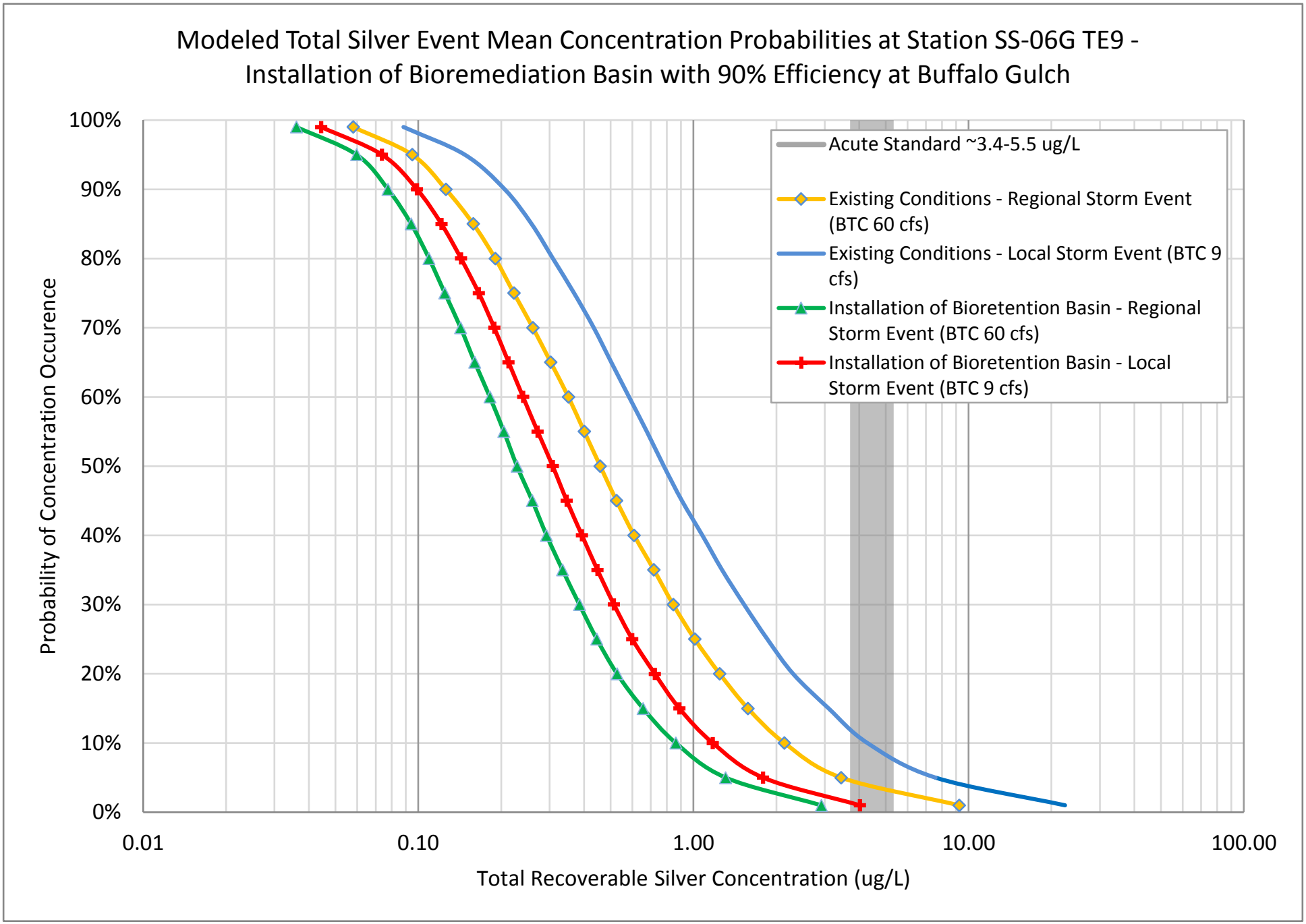


Figure E-70
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

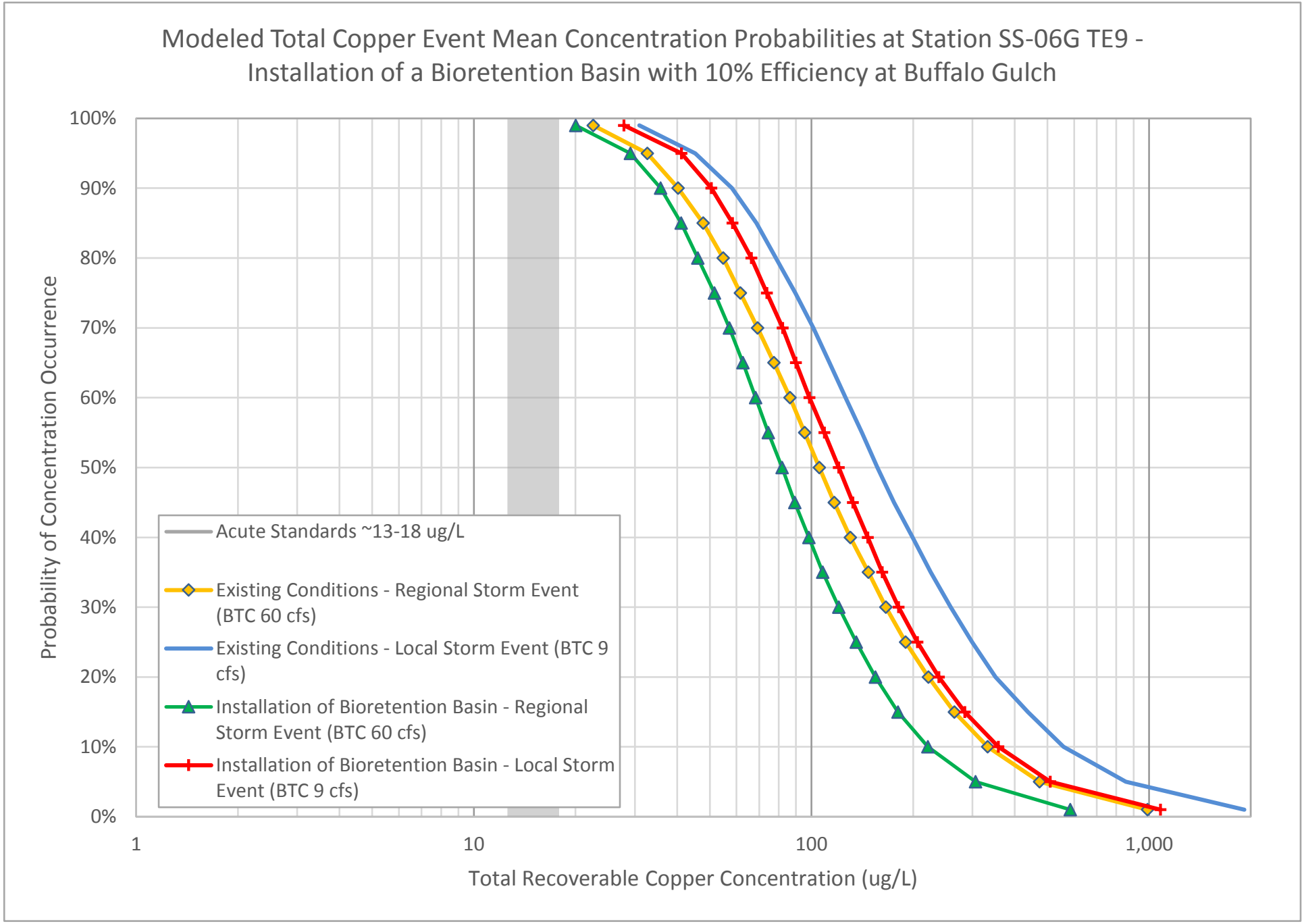


Figure E-71
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

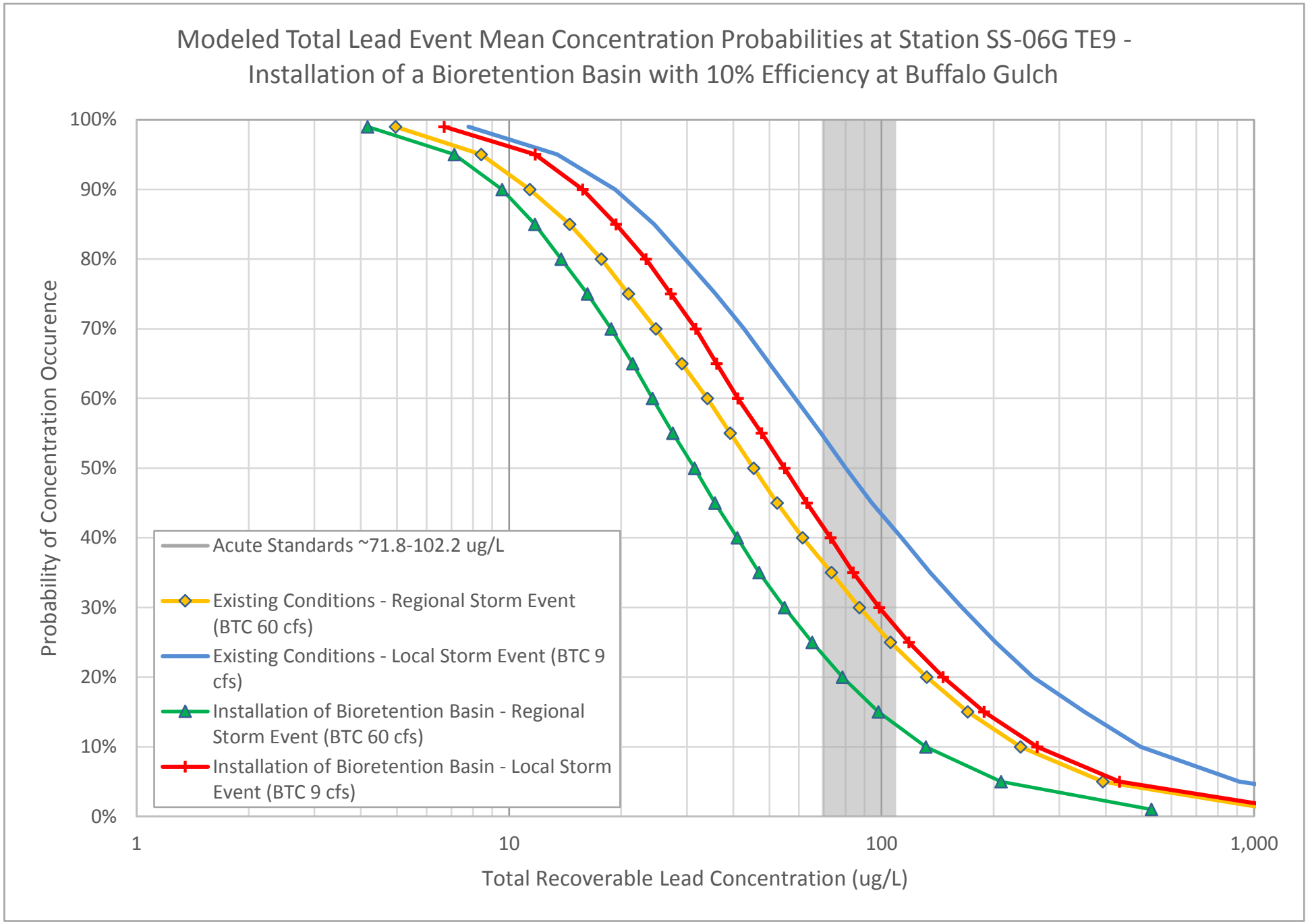


Figure E-72
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

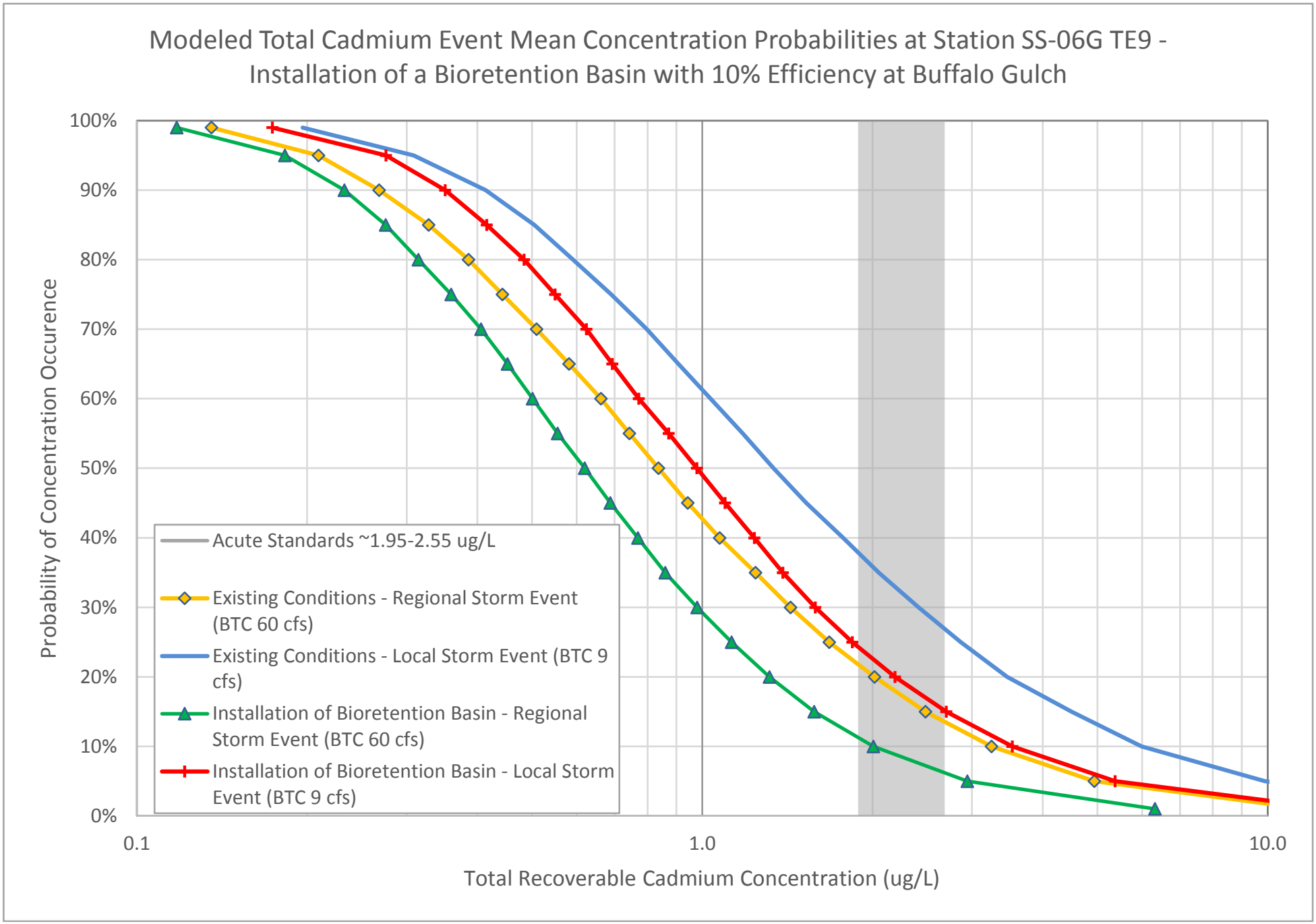


Figure E-73
Event Mean Concentration Results

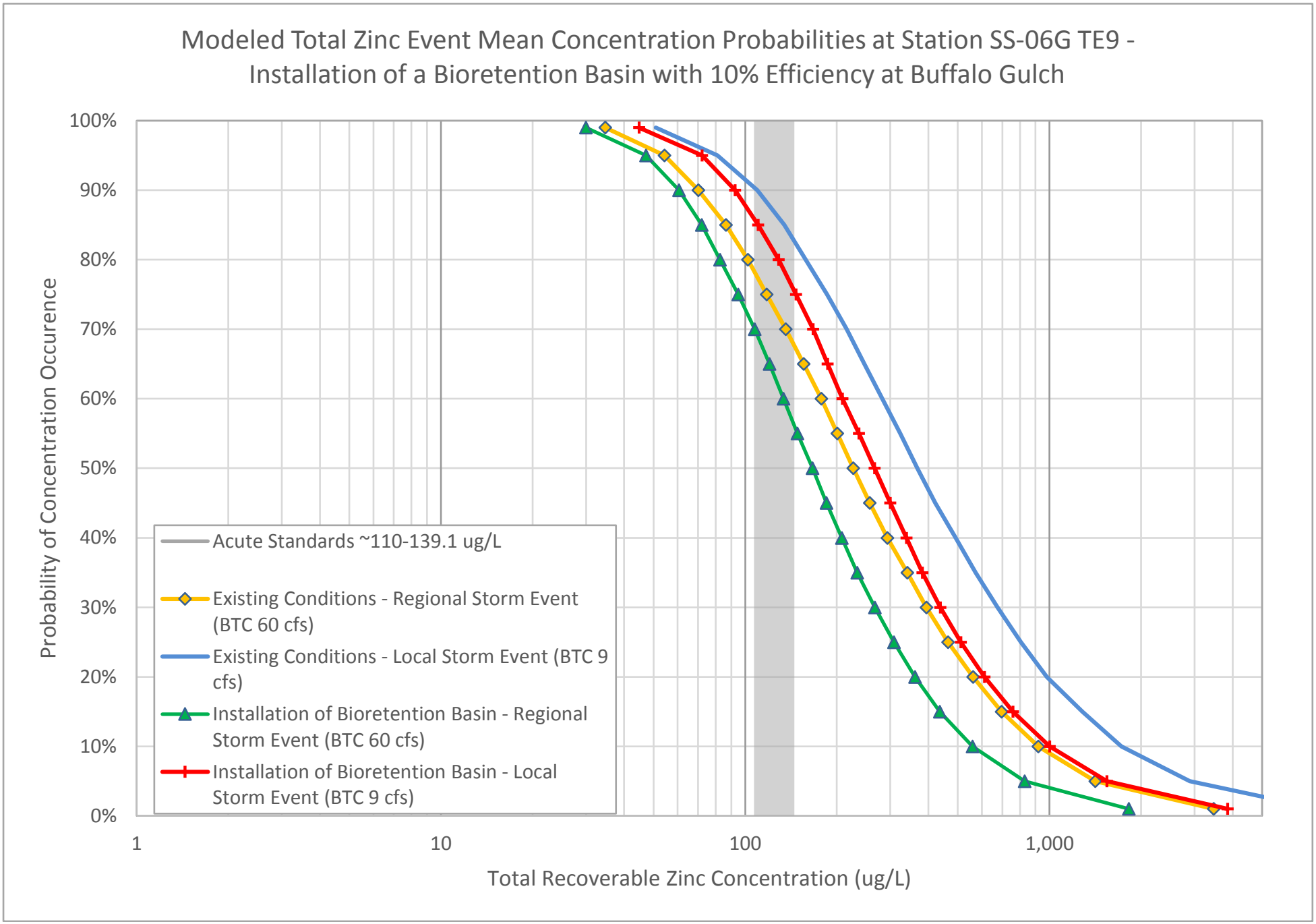


Figure E-74
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

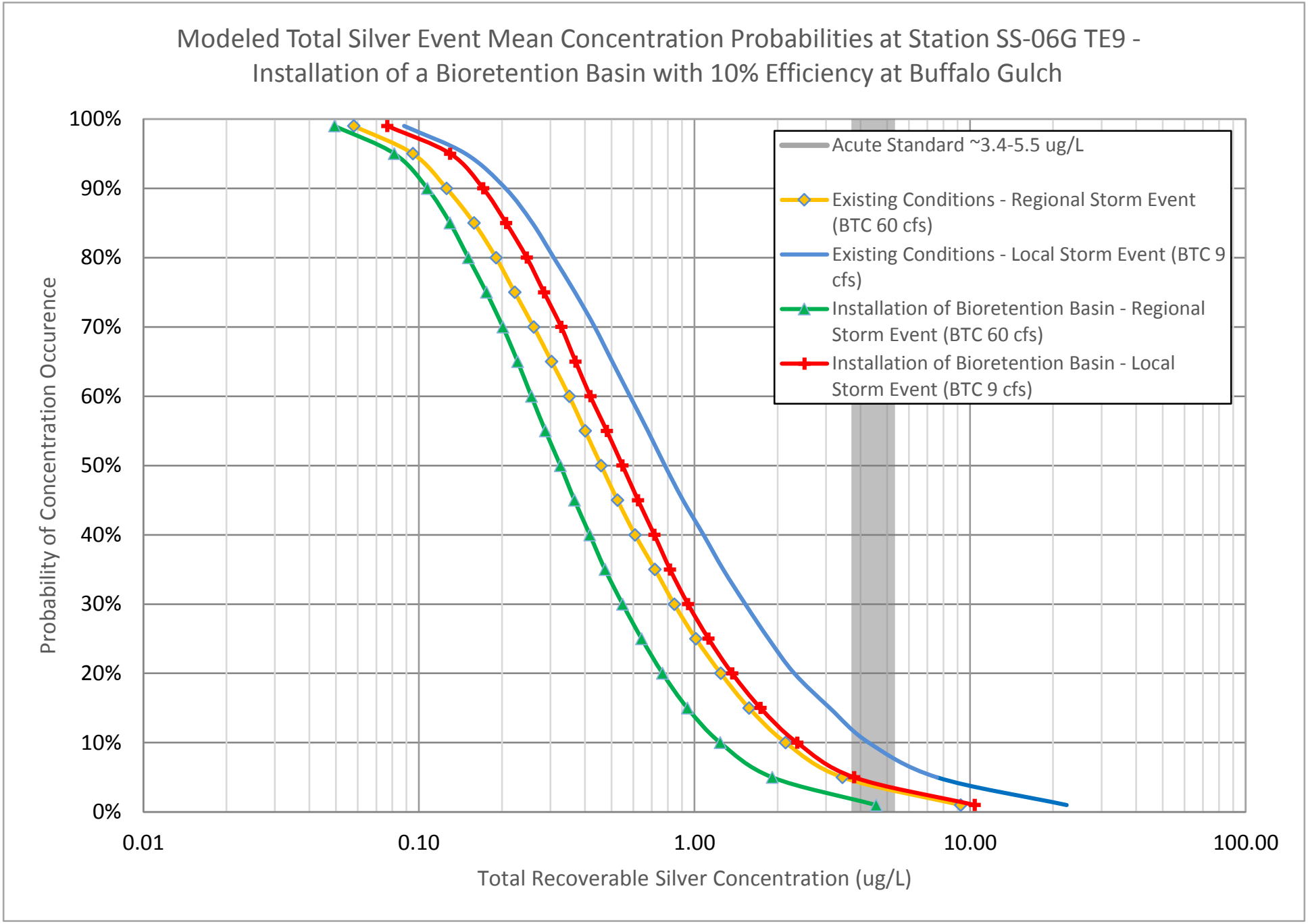


Figure E-75
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

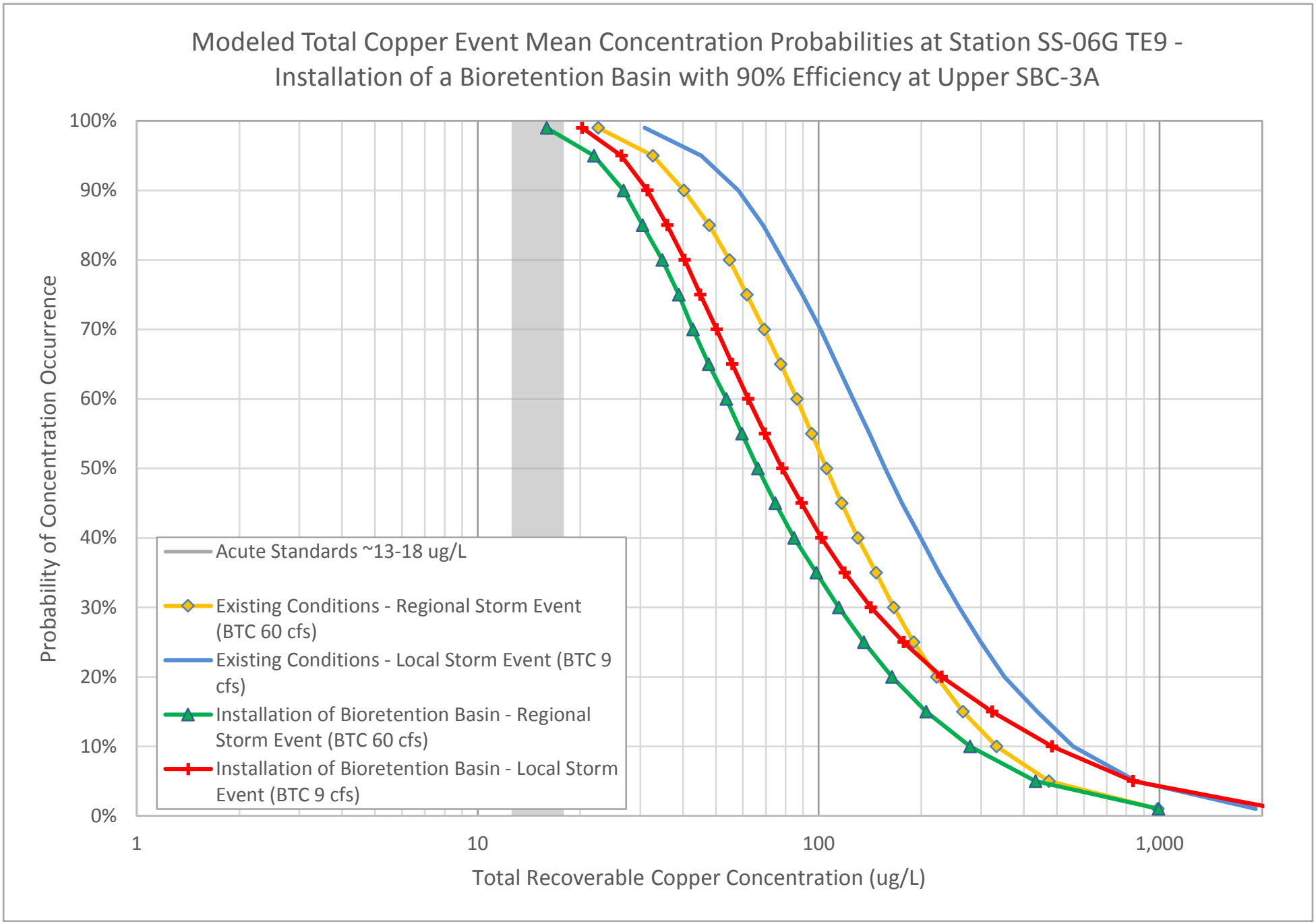


Figure E-76
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

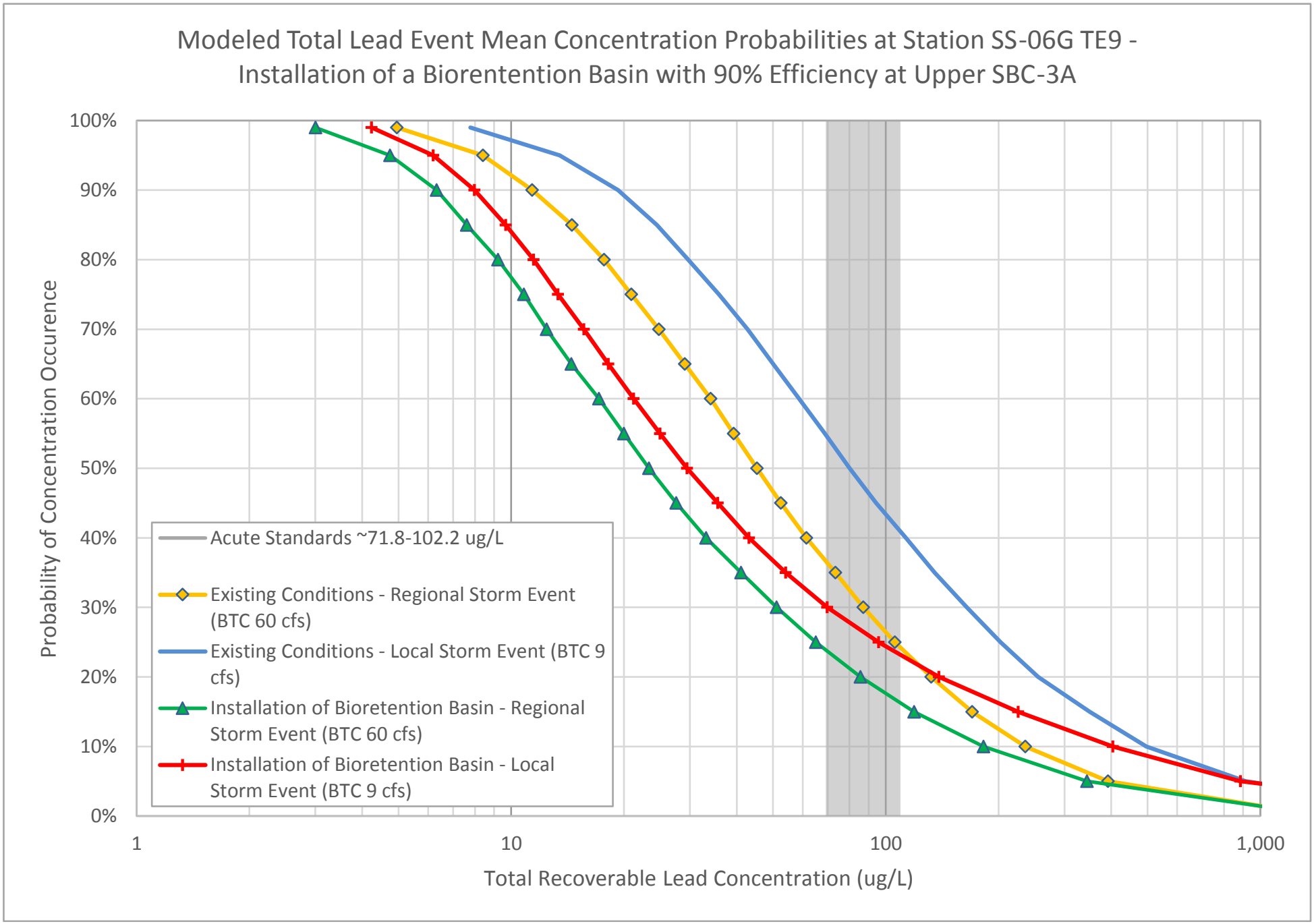


Figure E-77
Event Mean Concentration Results

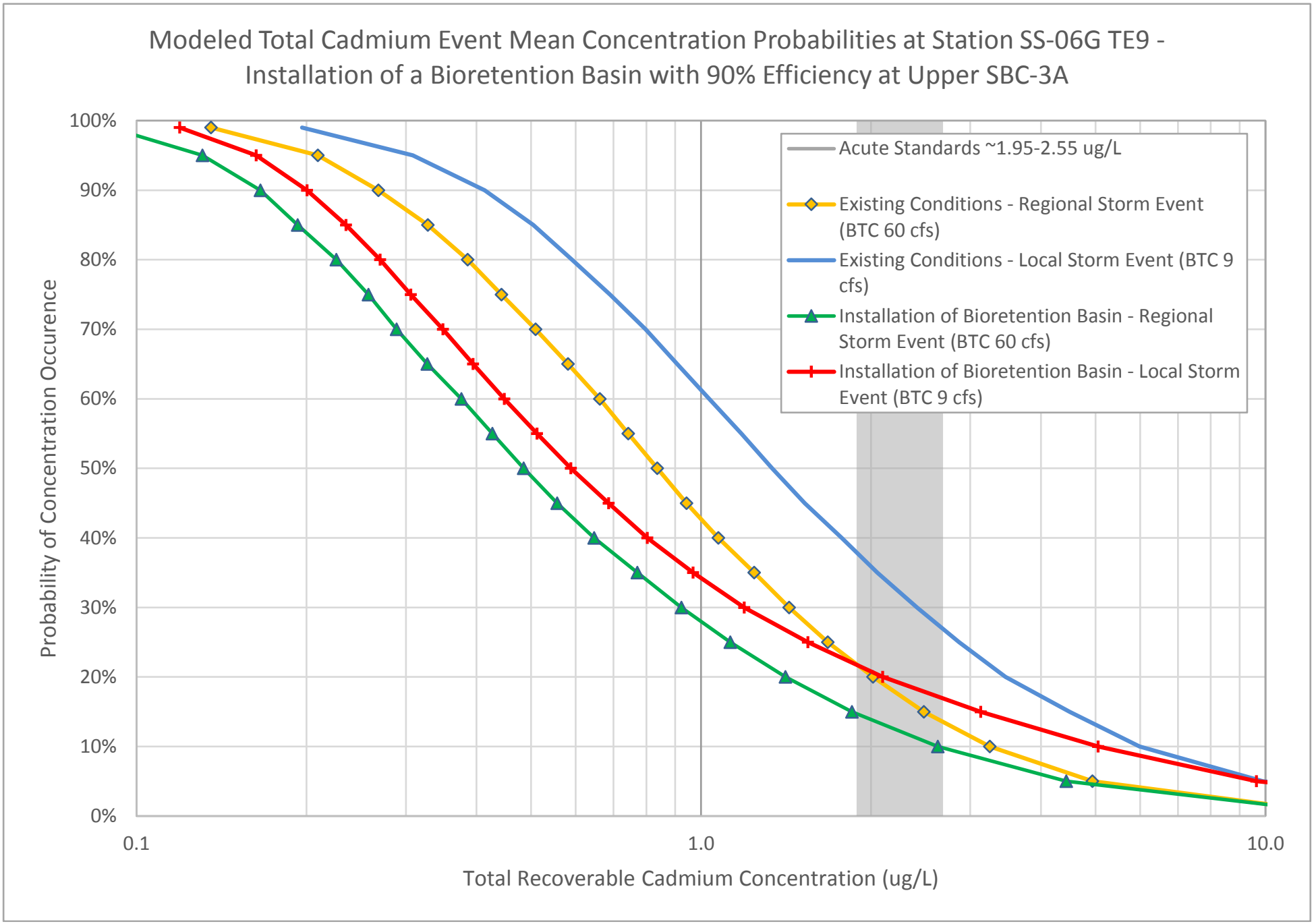


Figure E-78
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

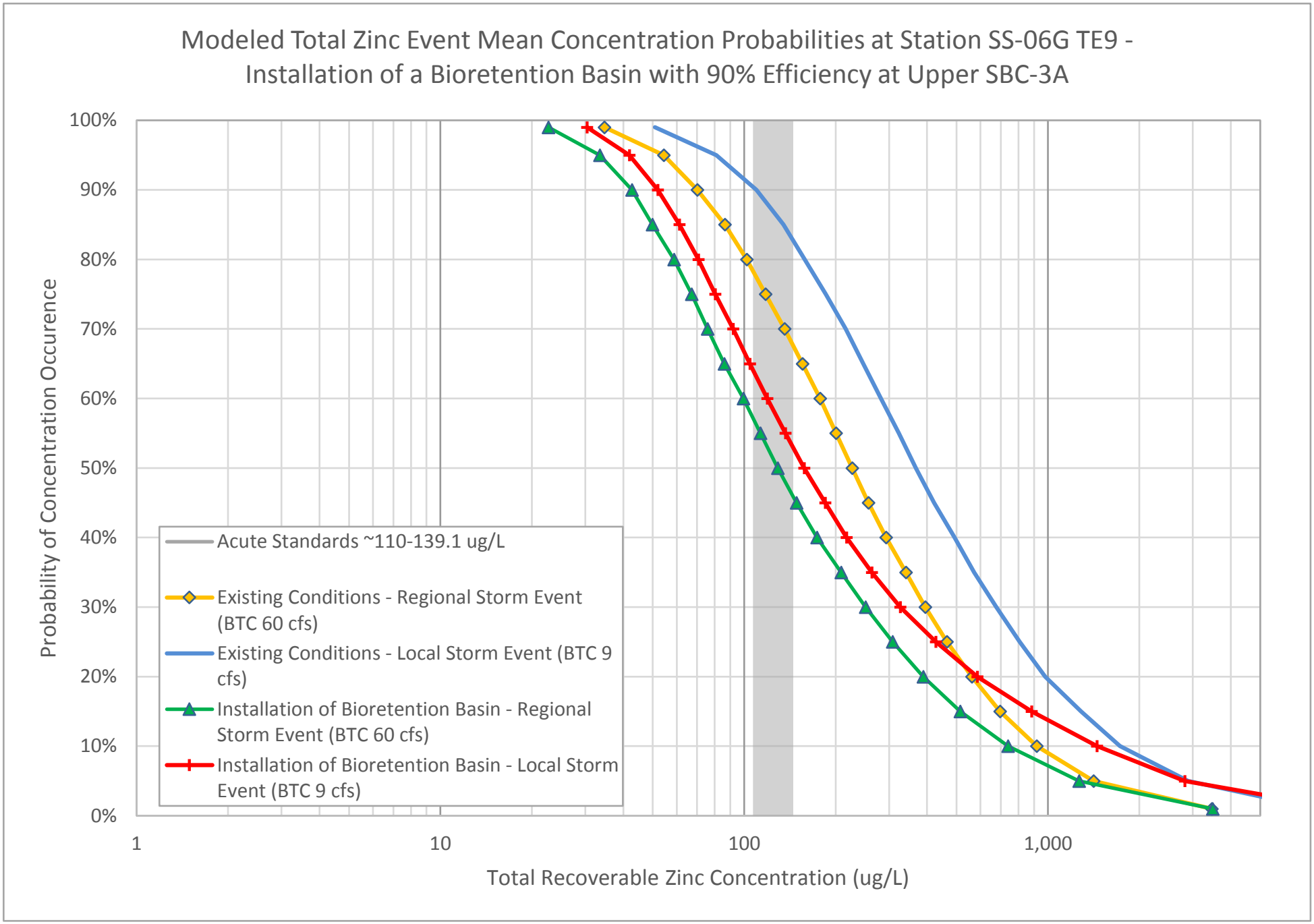


Figure E-79
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

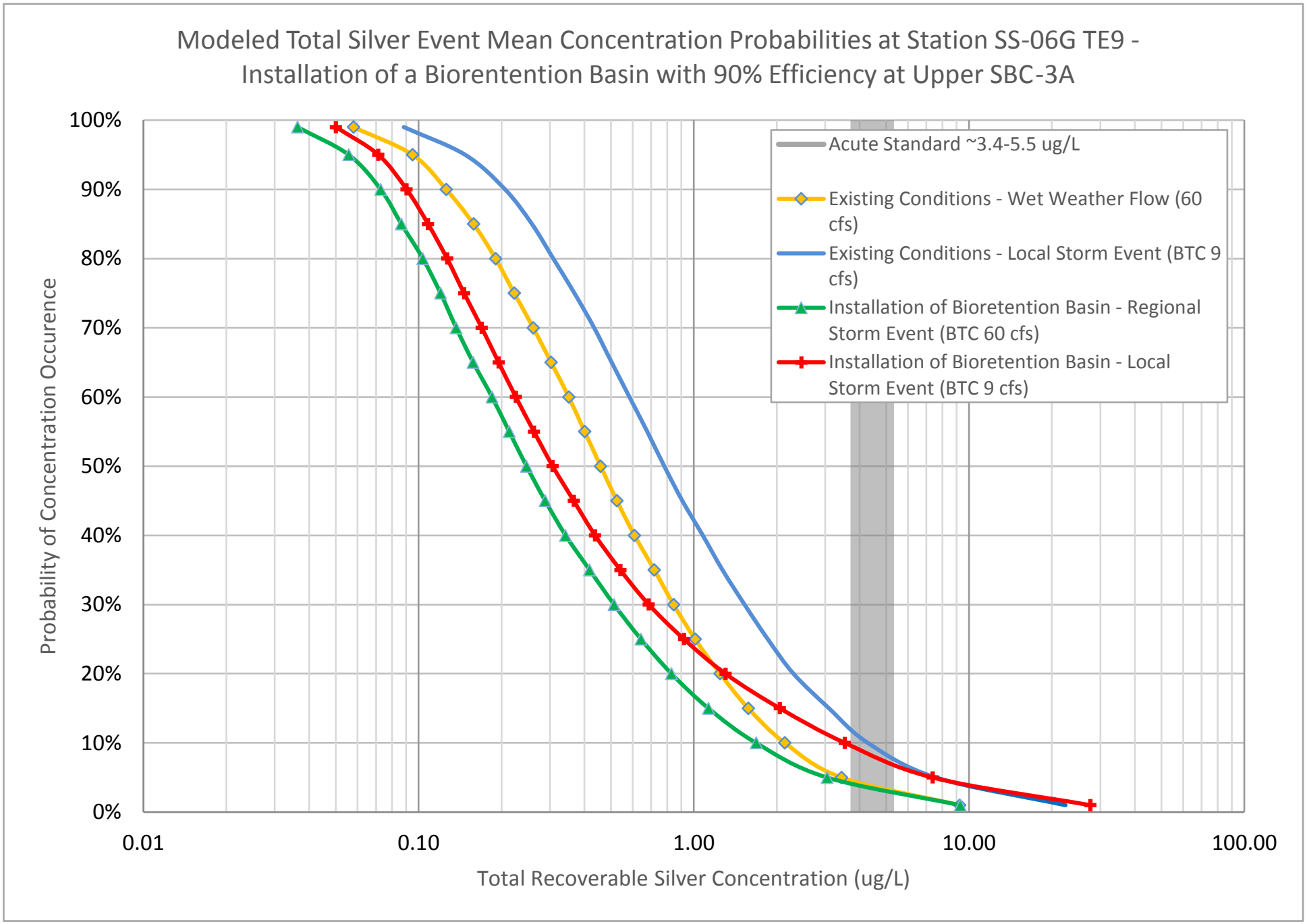


Figure E-80
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

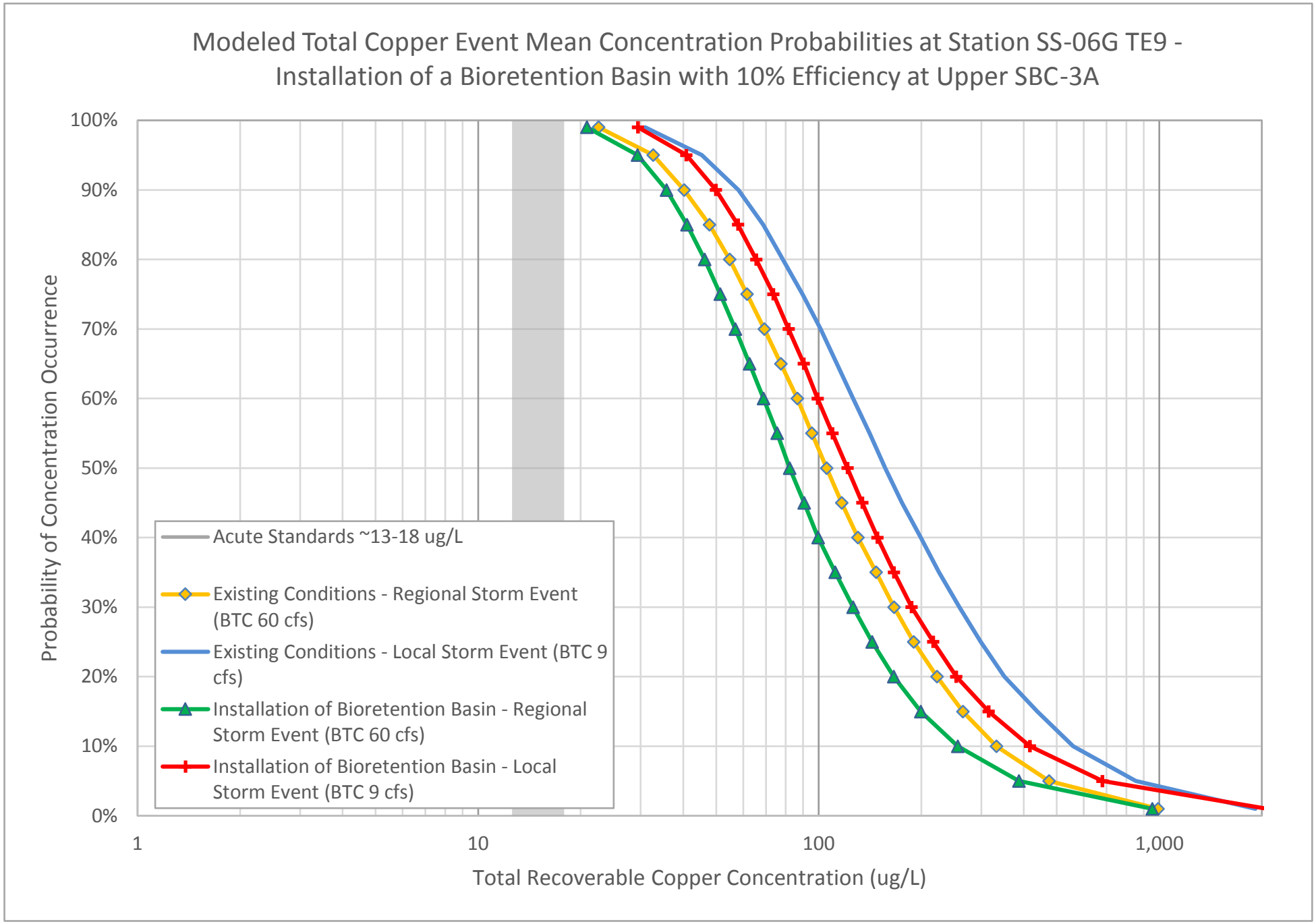


Figure E-81
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

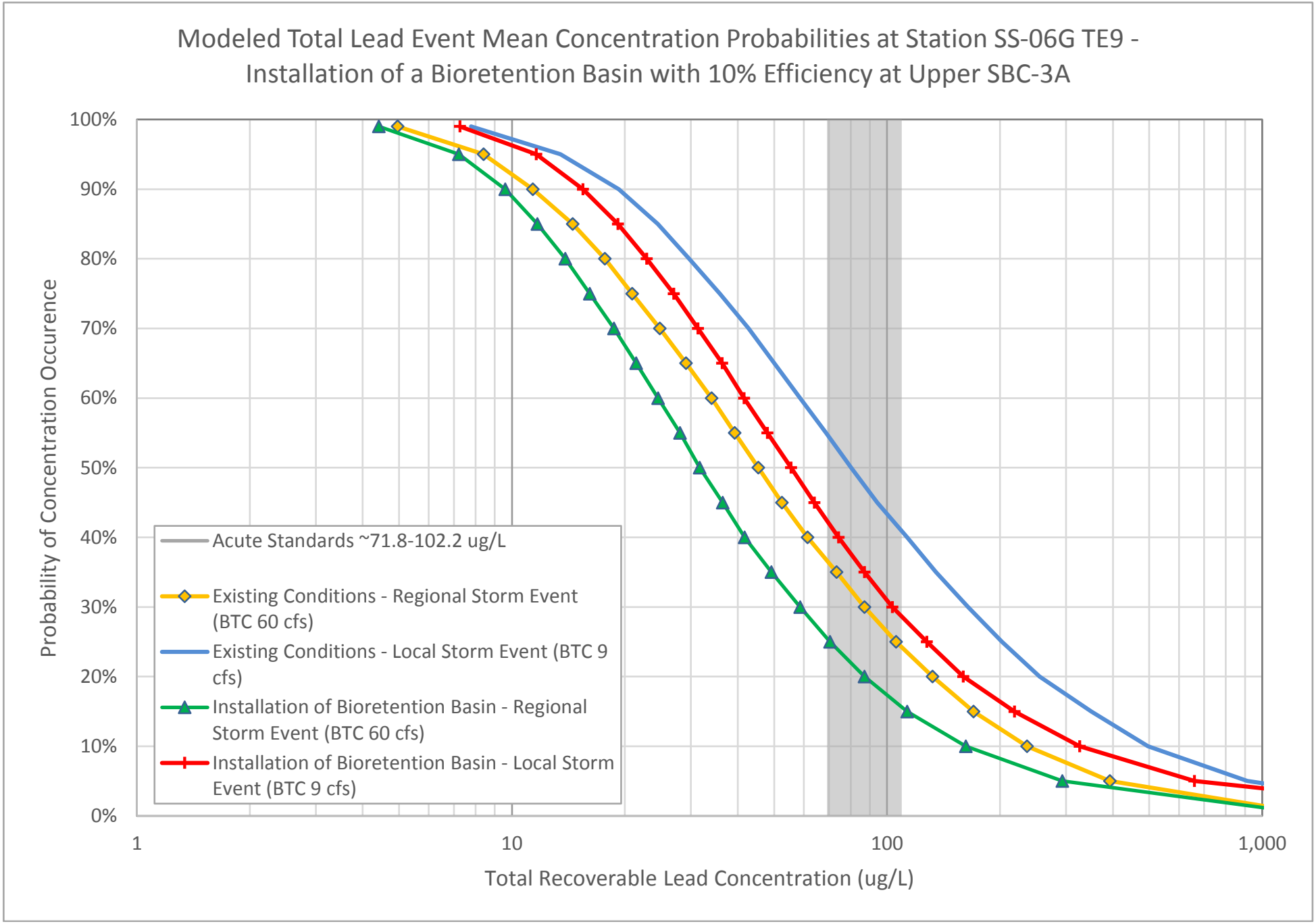


Figure E-82
Event Mean Concentration Results

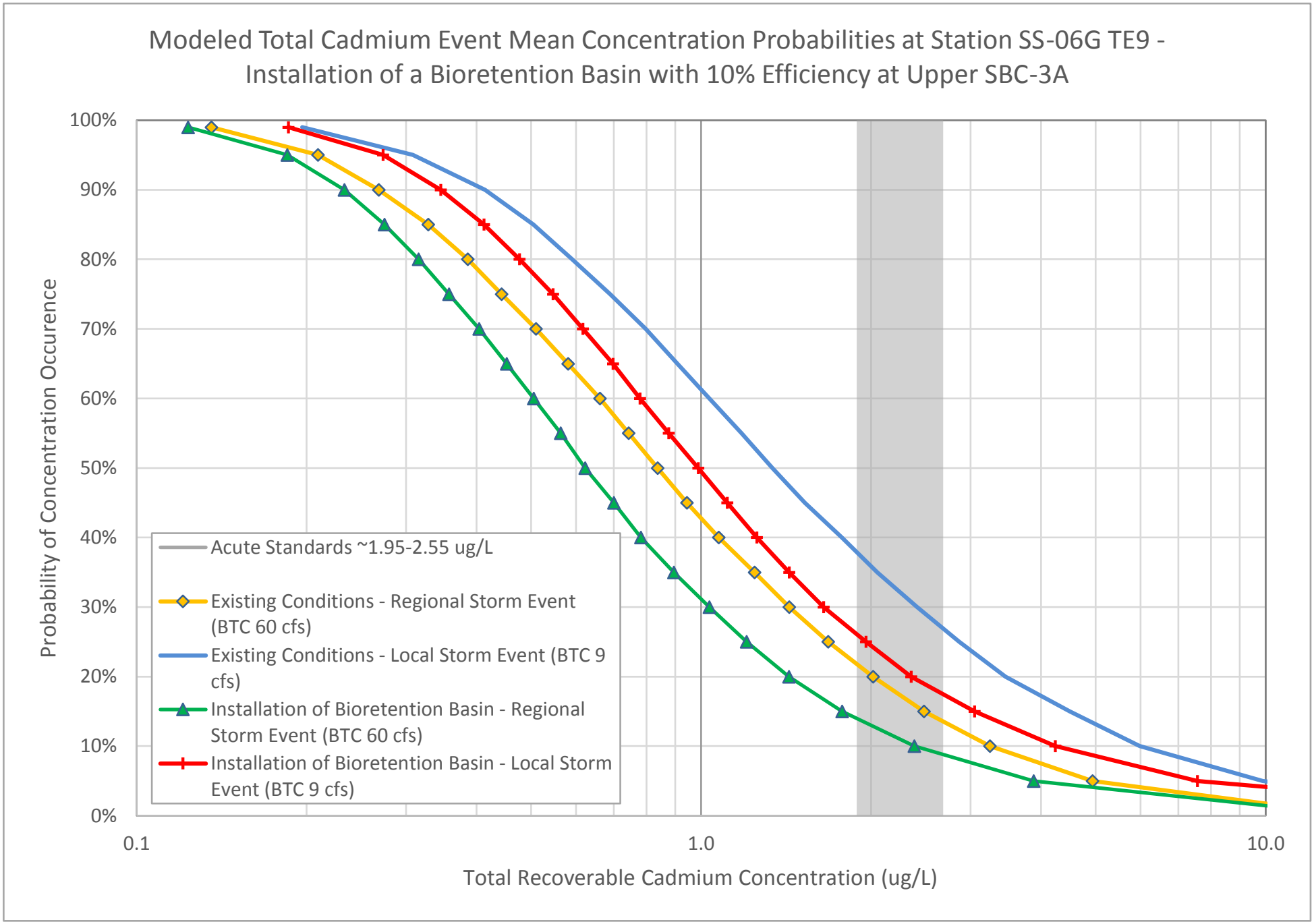


Figure E-83
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

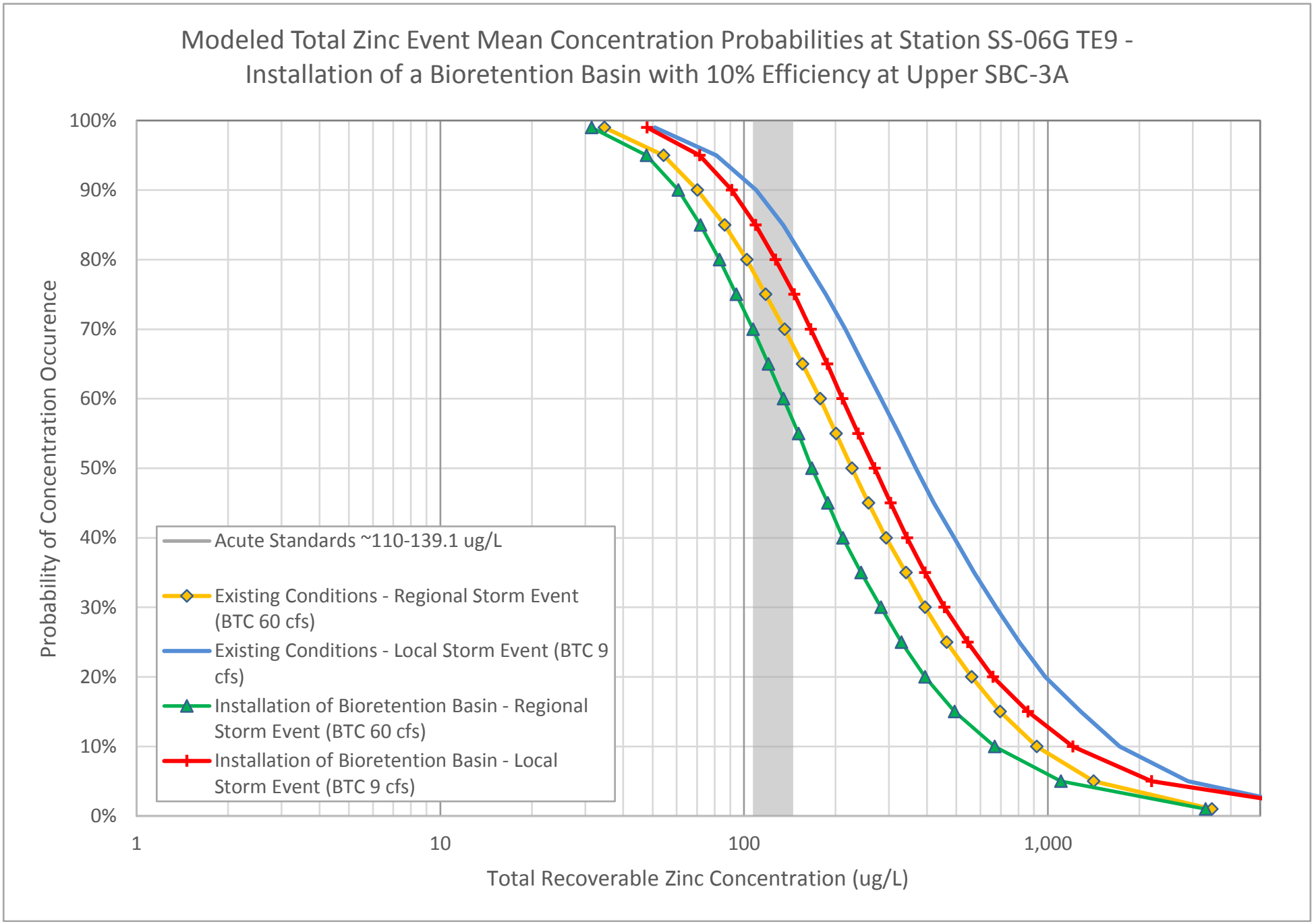


Figure E-84
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

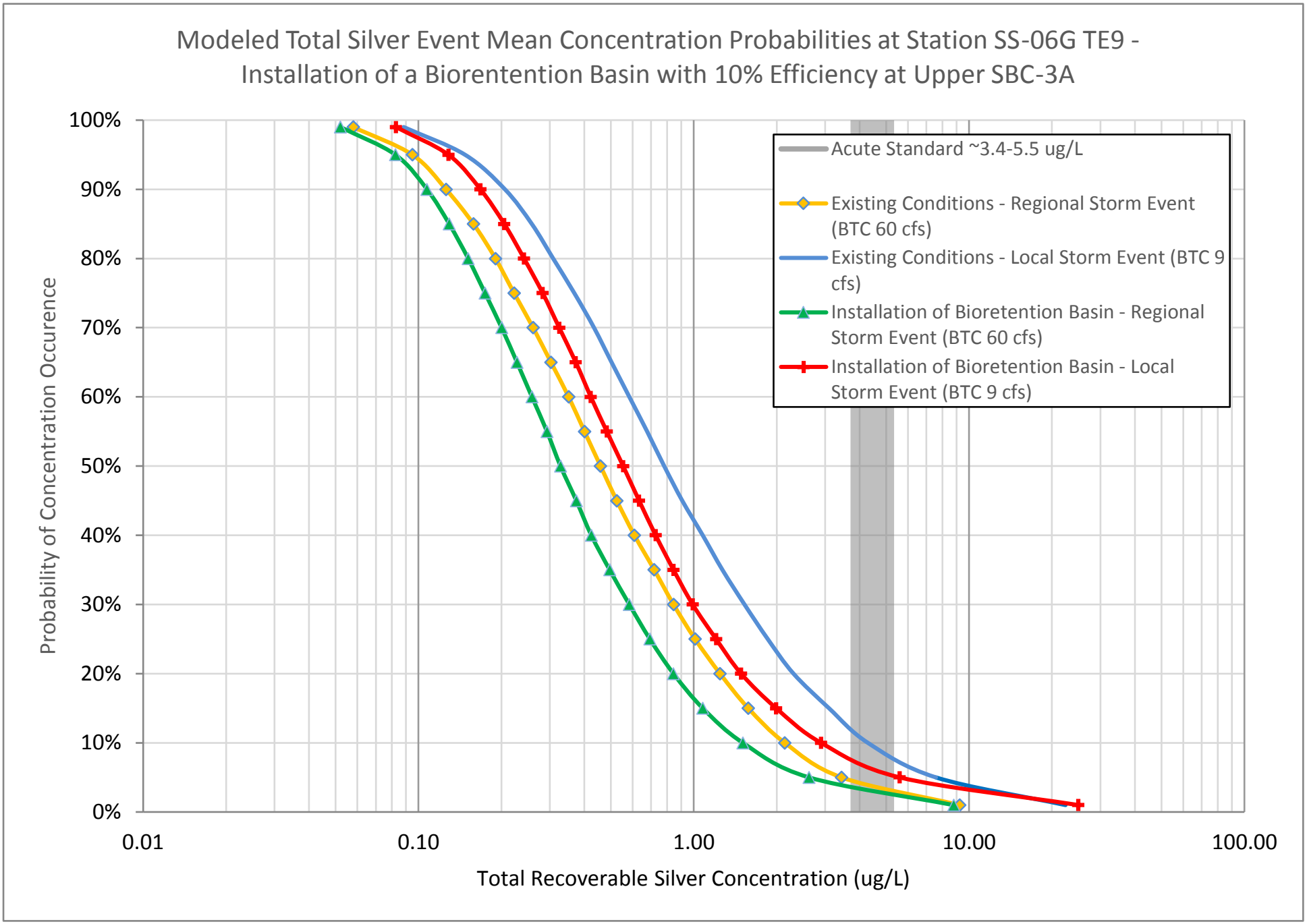


Figure E-85
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

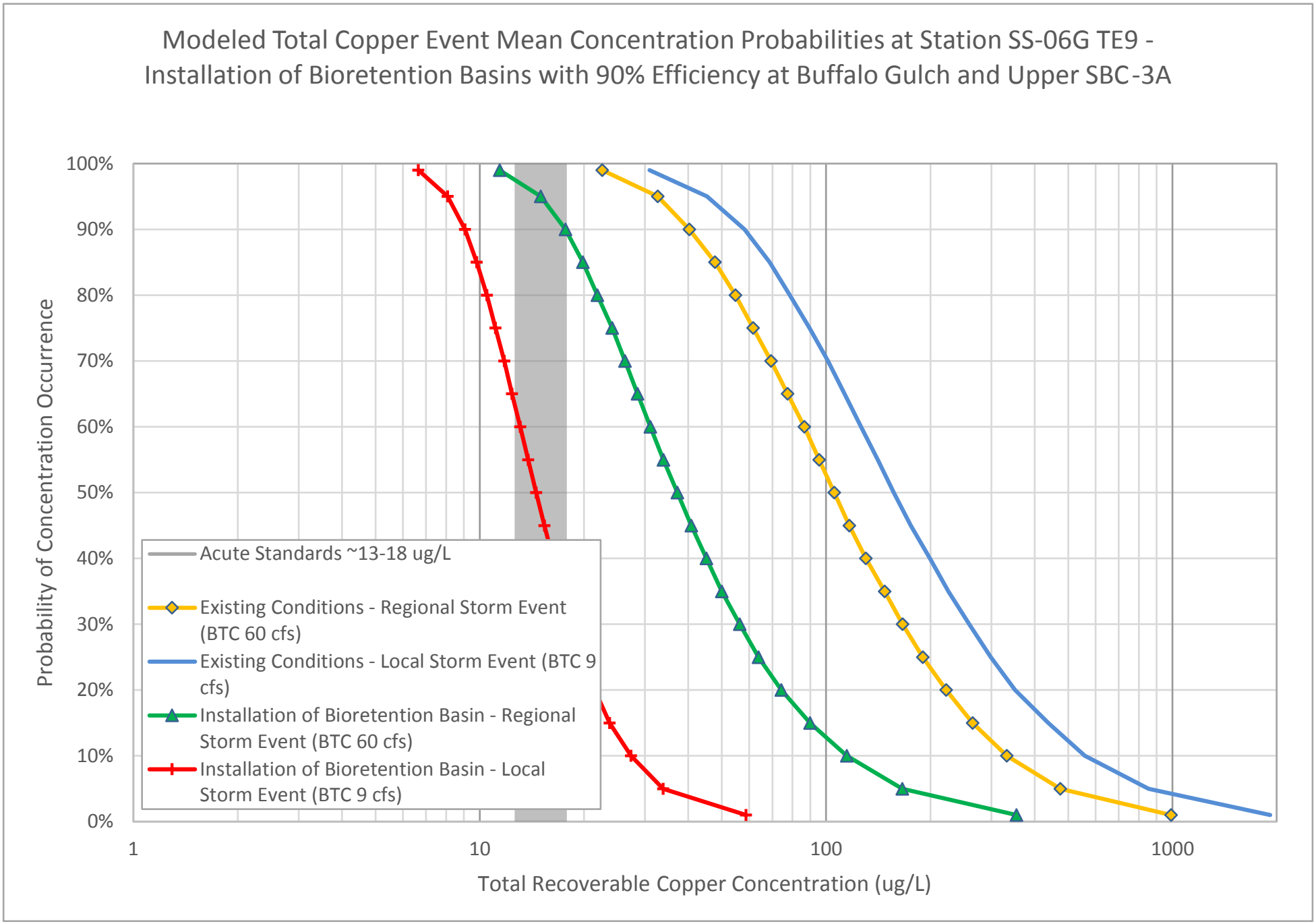


Figure E-86
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

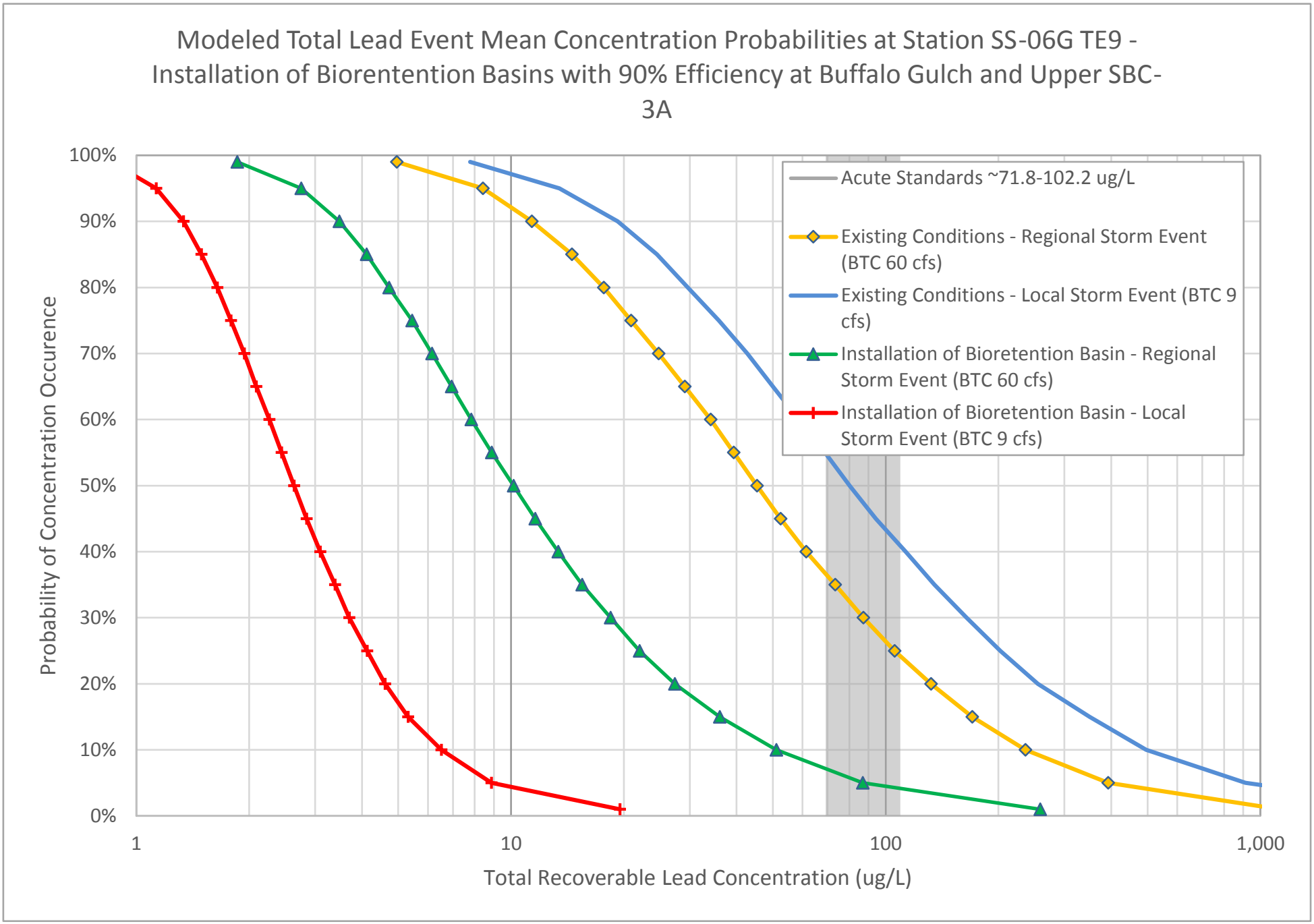


Figure E-87
Event Mean Concentration Results

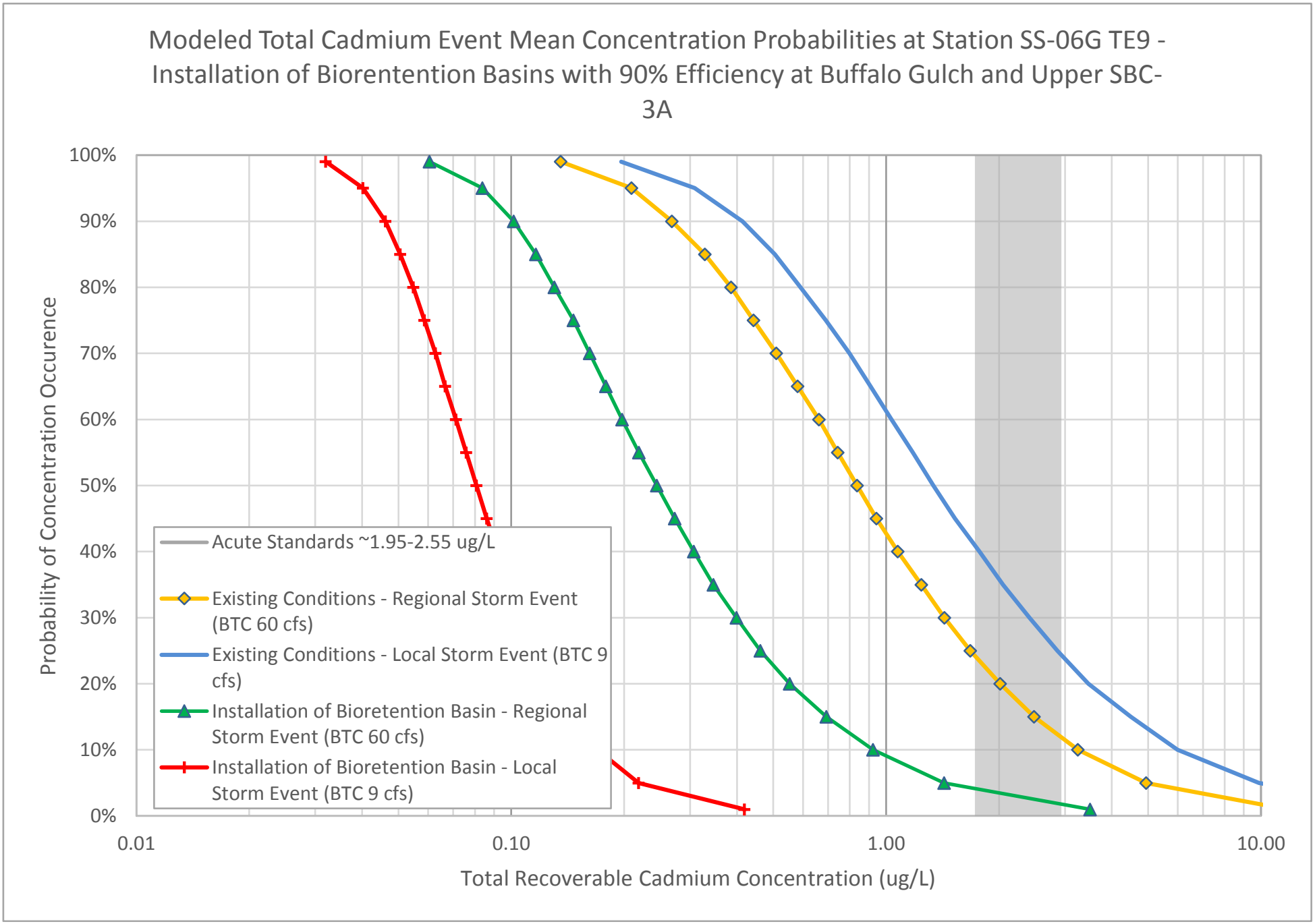


Figure E-88
Event Mean Concentration Results

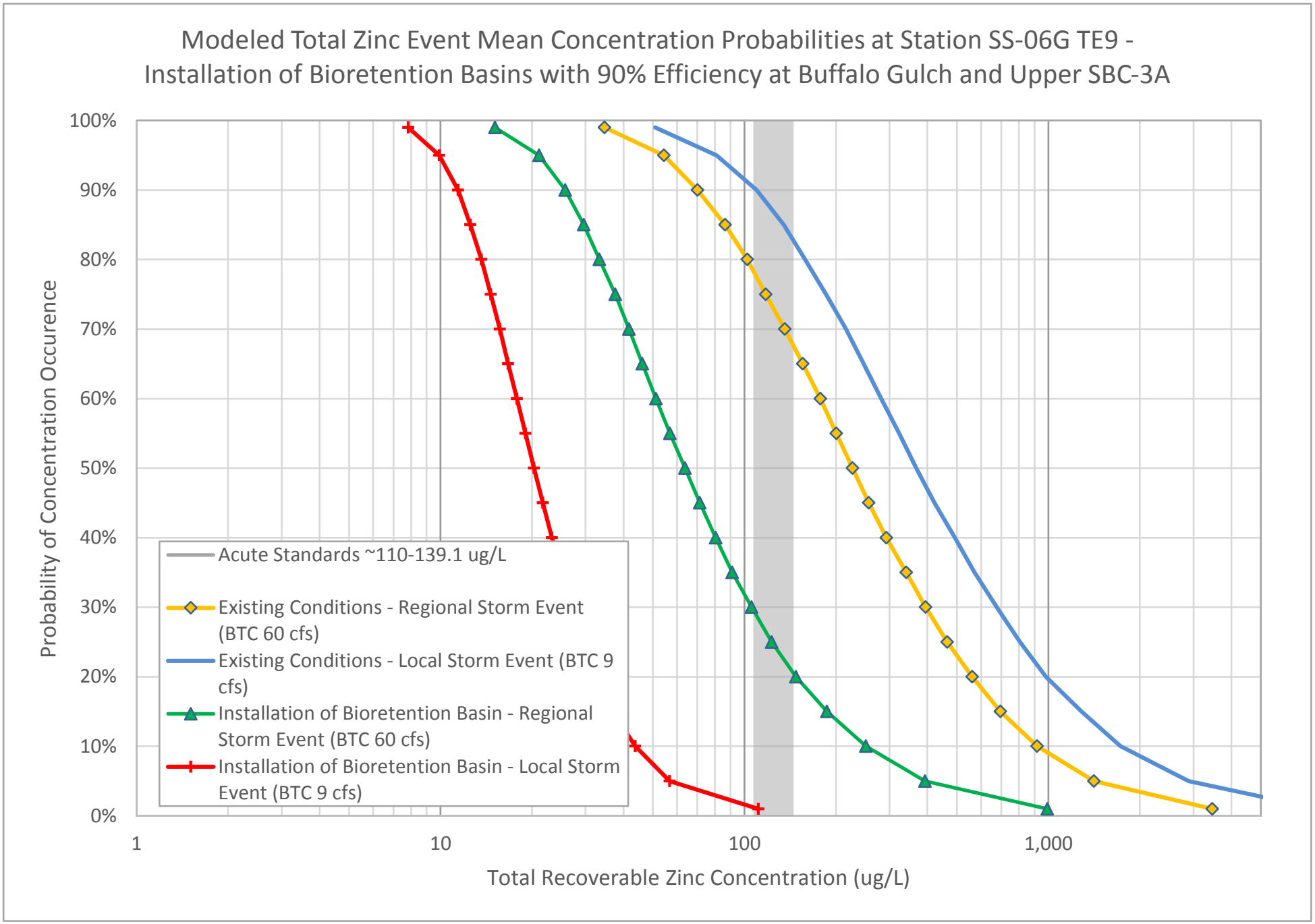


Figure E-89
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

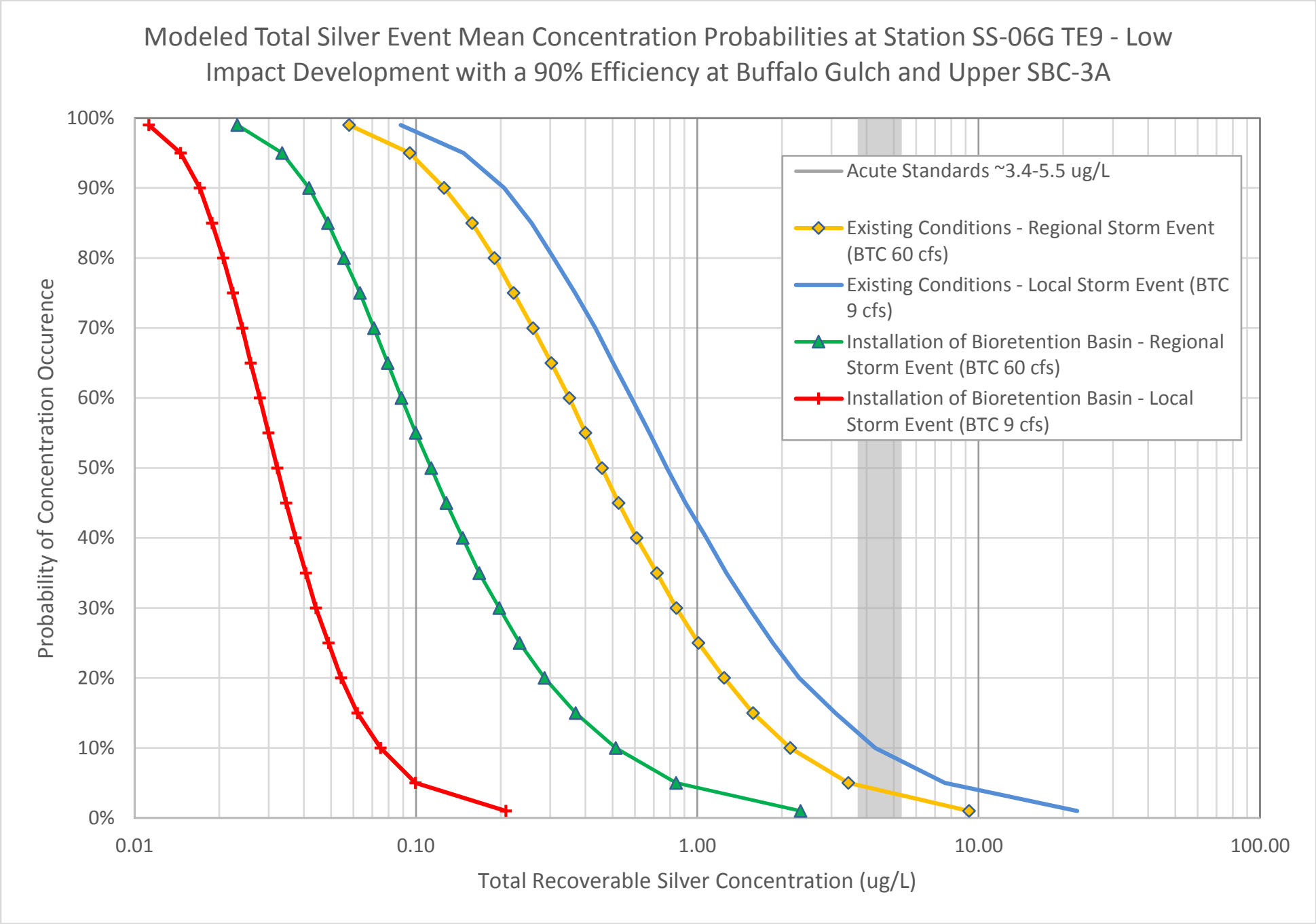


Figure E-90
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

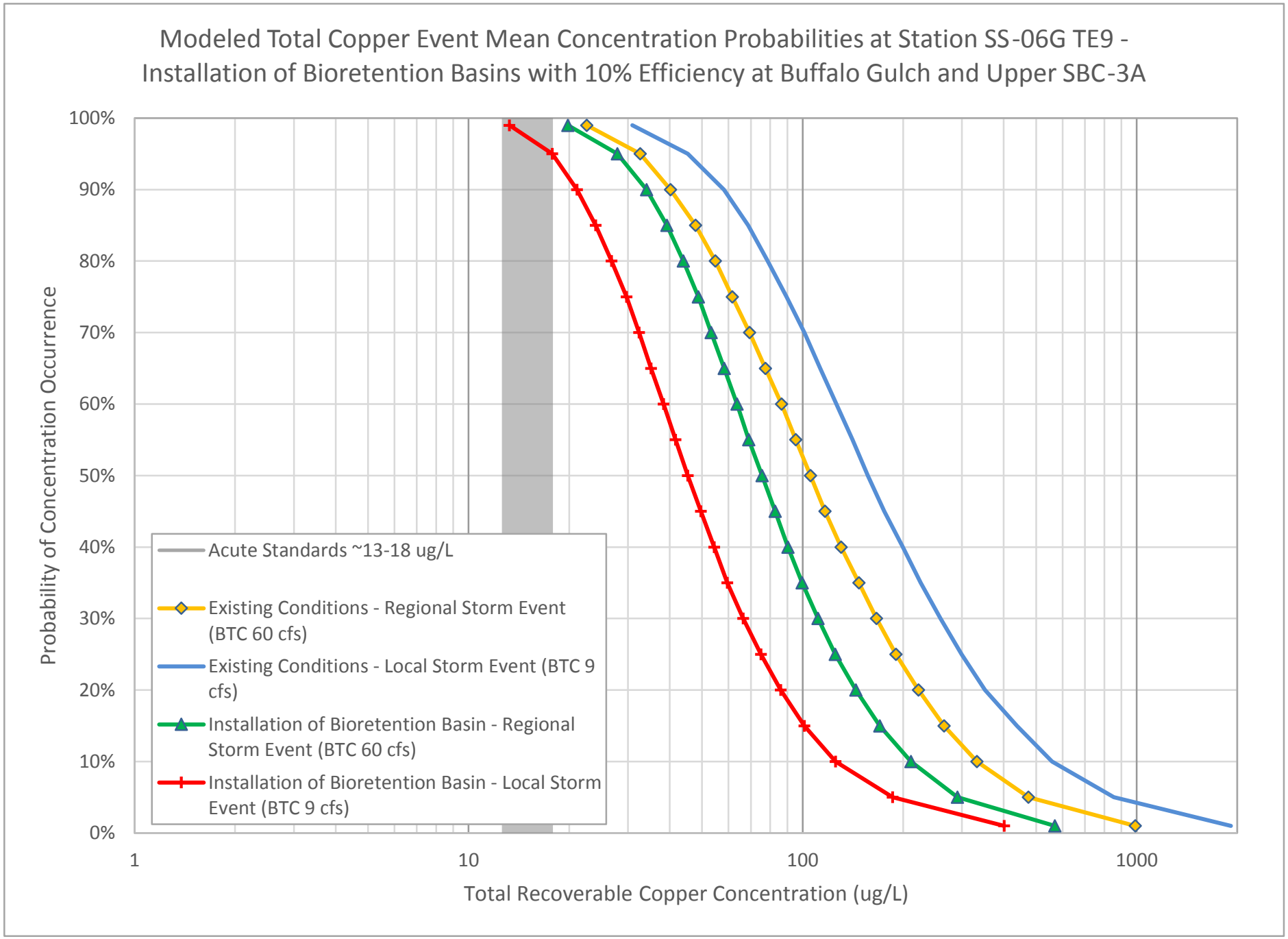


Figure E-91
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

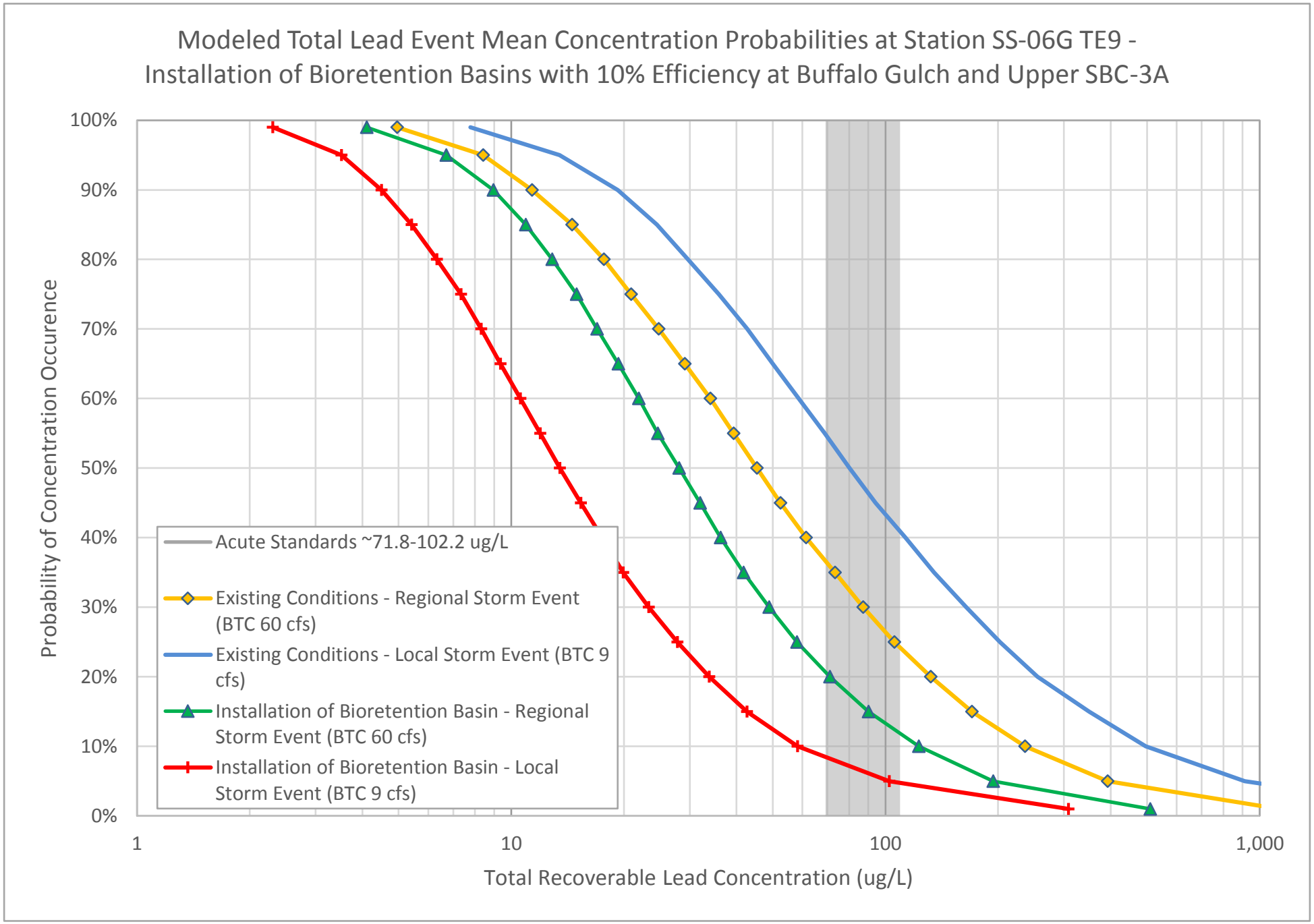


Figure E-92
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

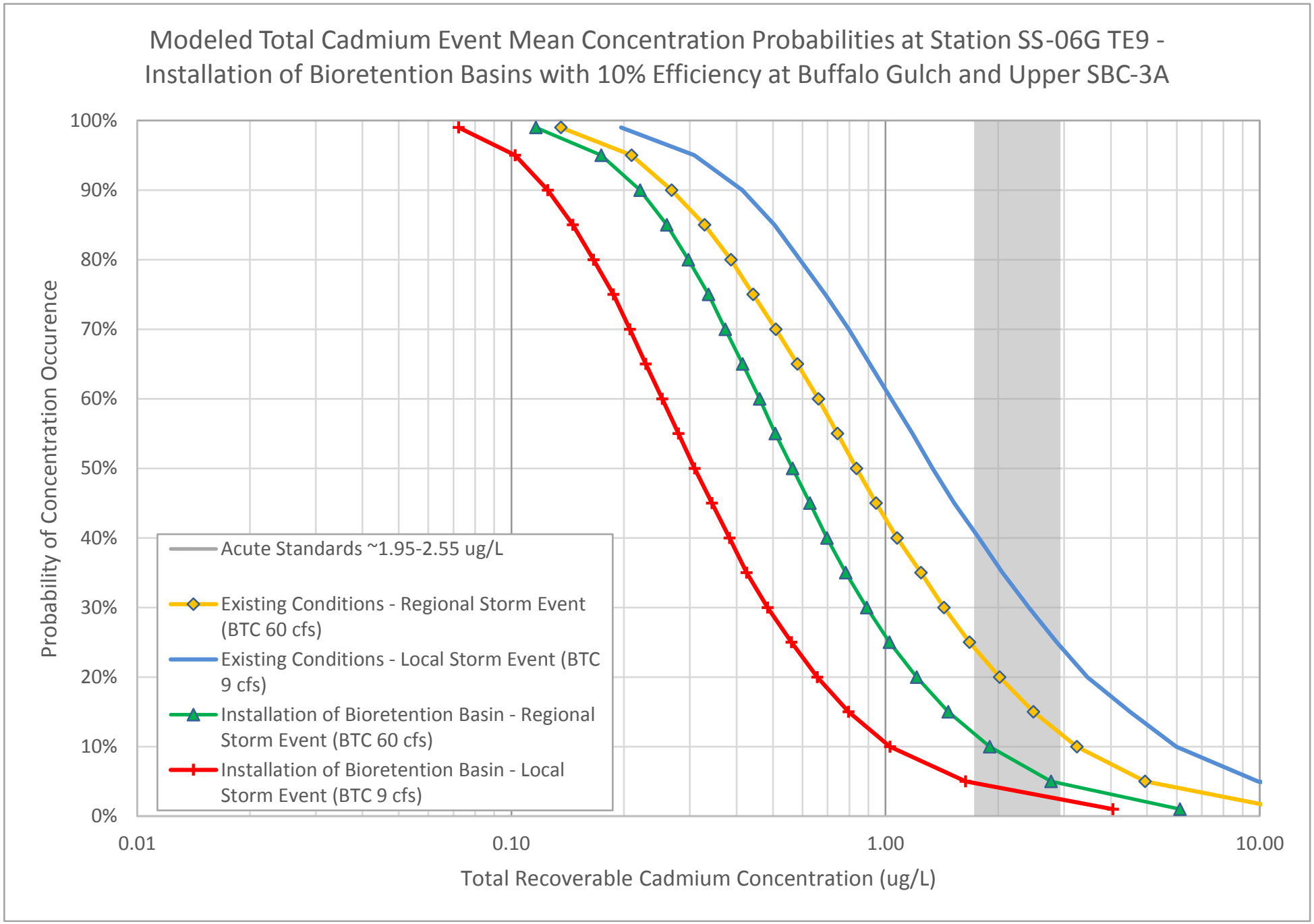


Figure E-93
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

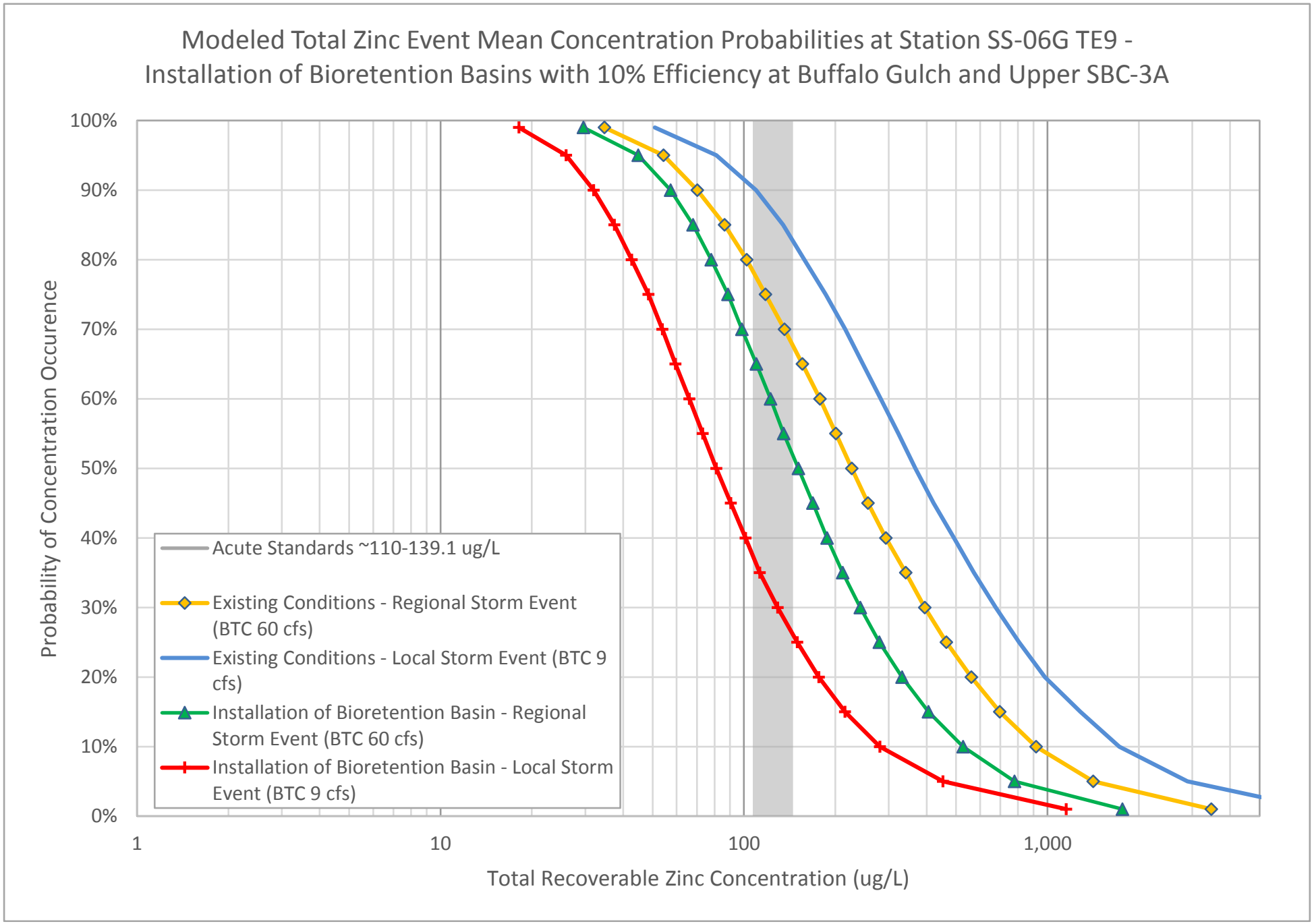


Figure E-94
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

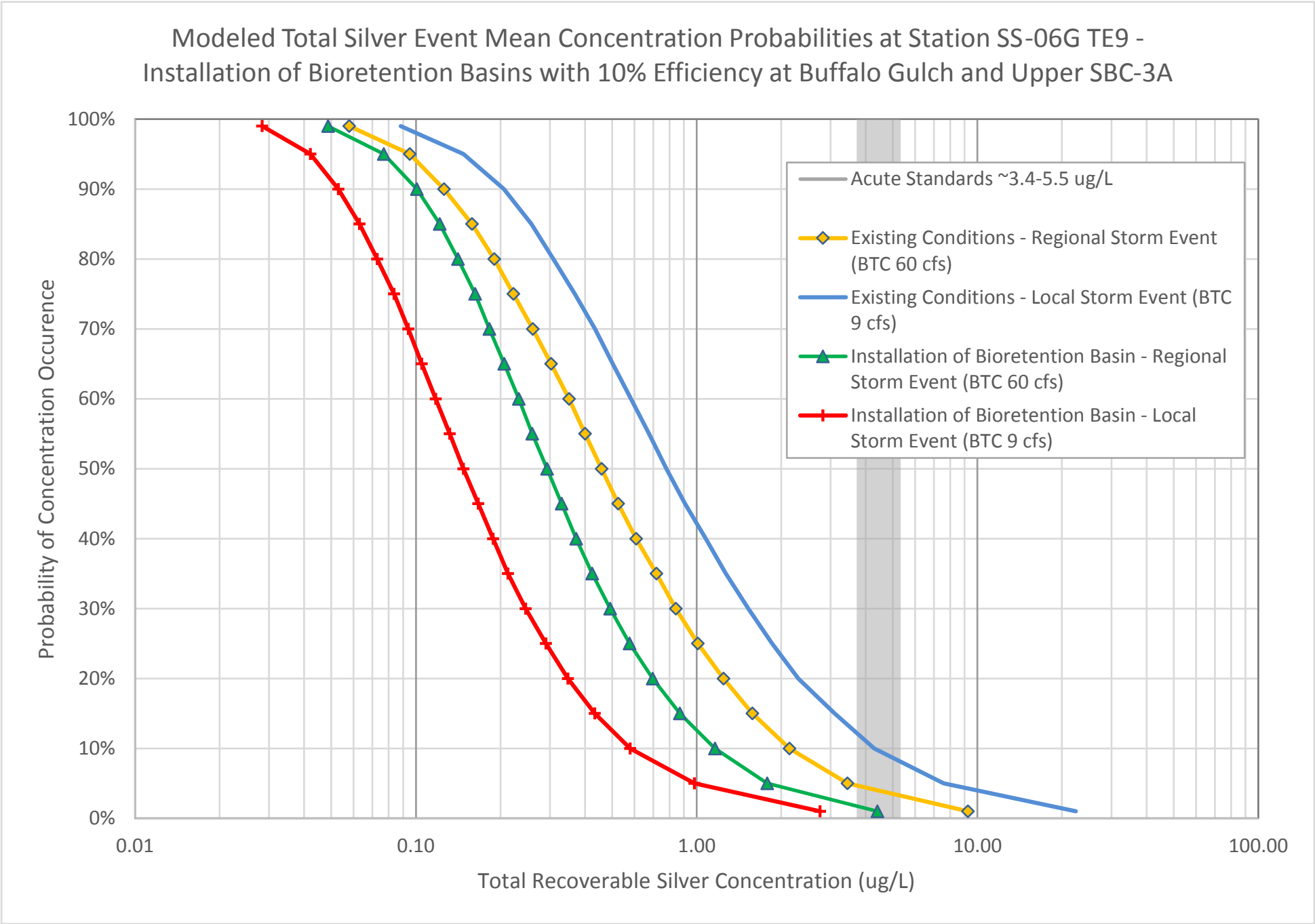


Figure E-95
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

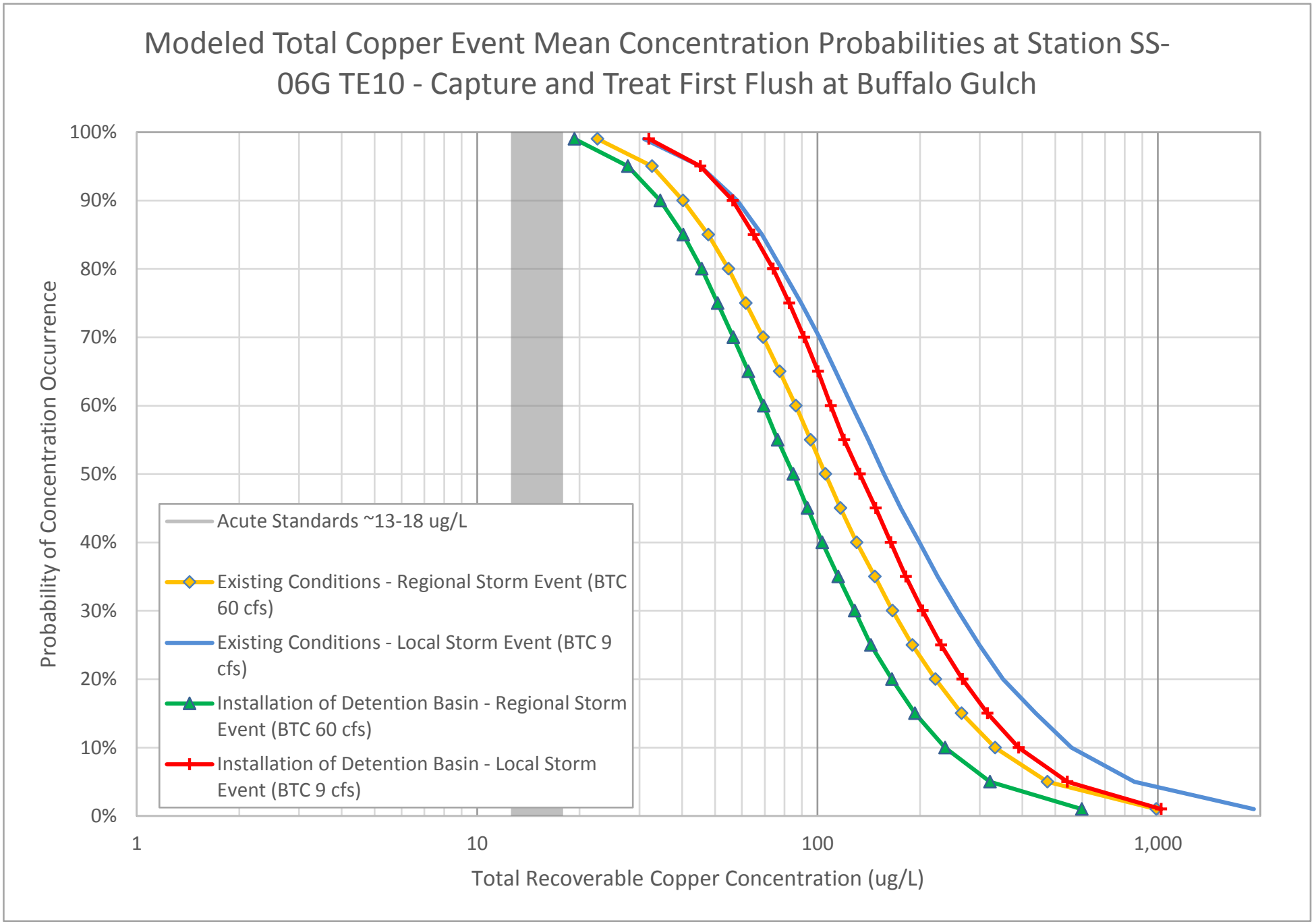


Figure E-96
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

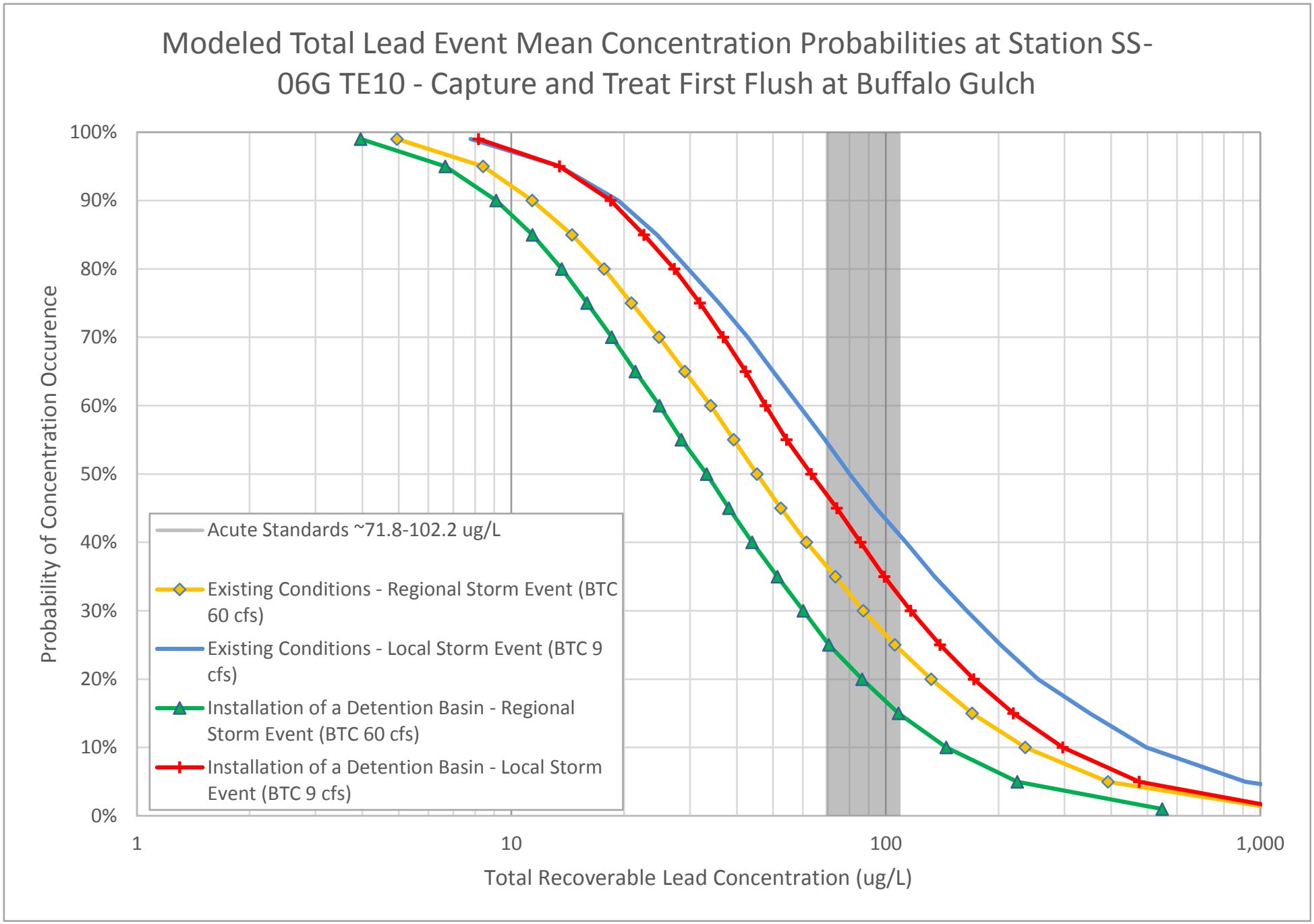


Figure E-97
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

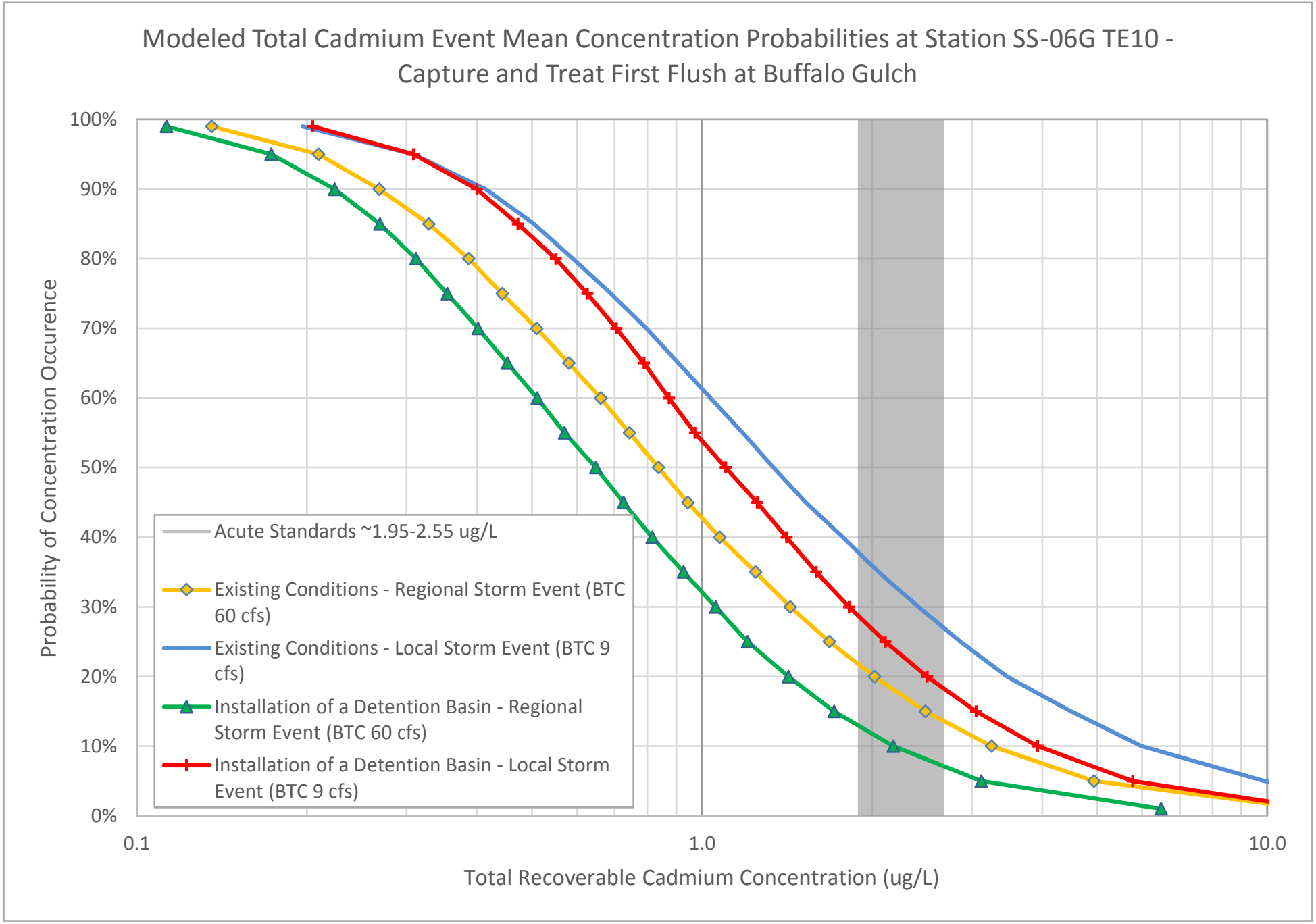


Figure E-98
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

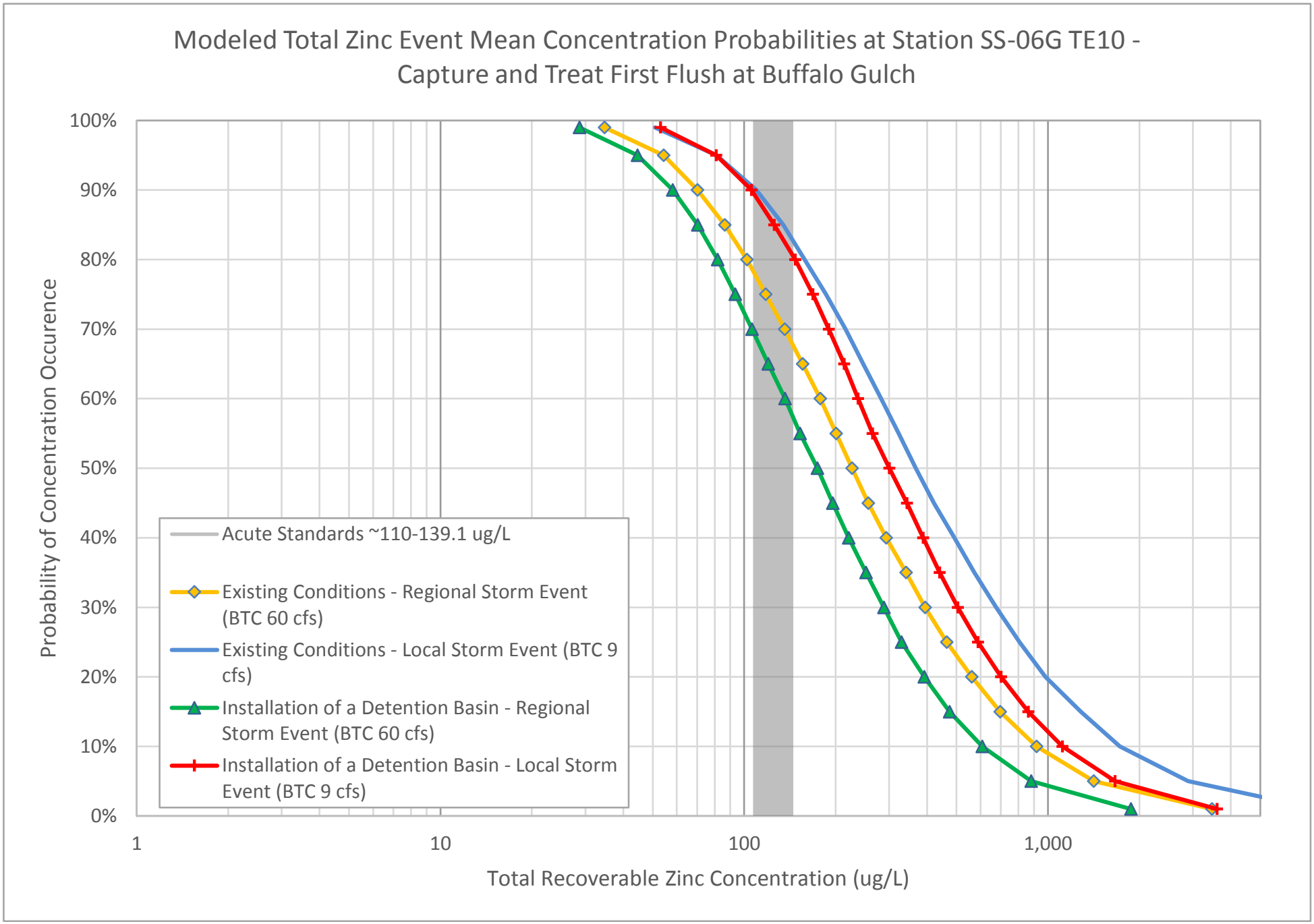


Figure E-99
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

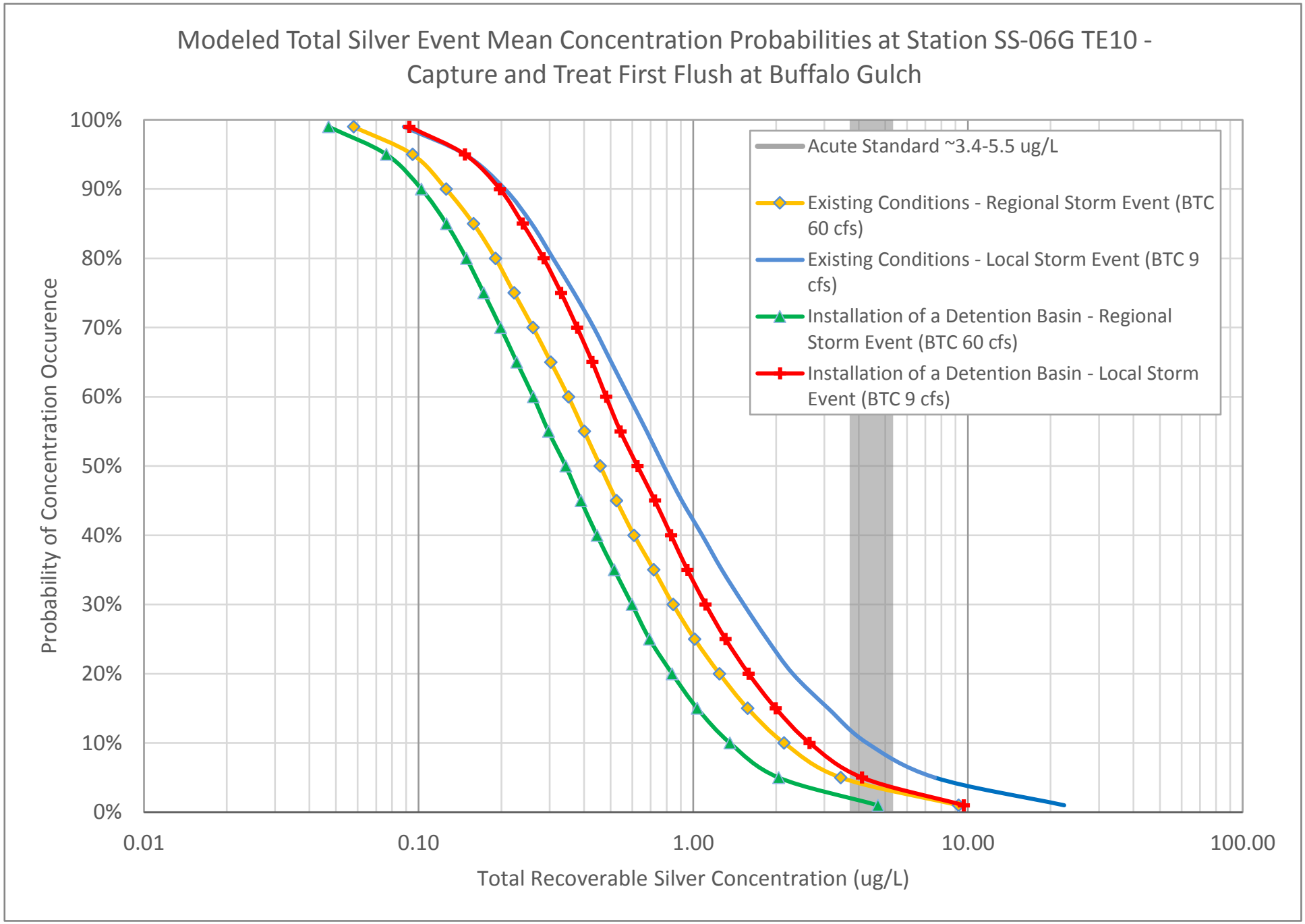


Figure E-100
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

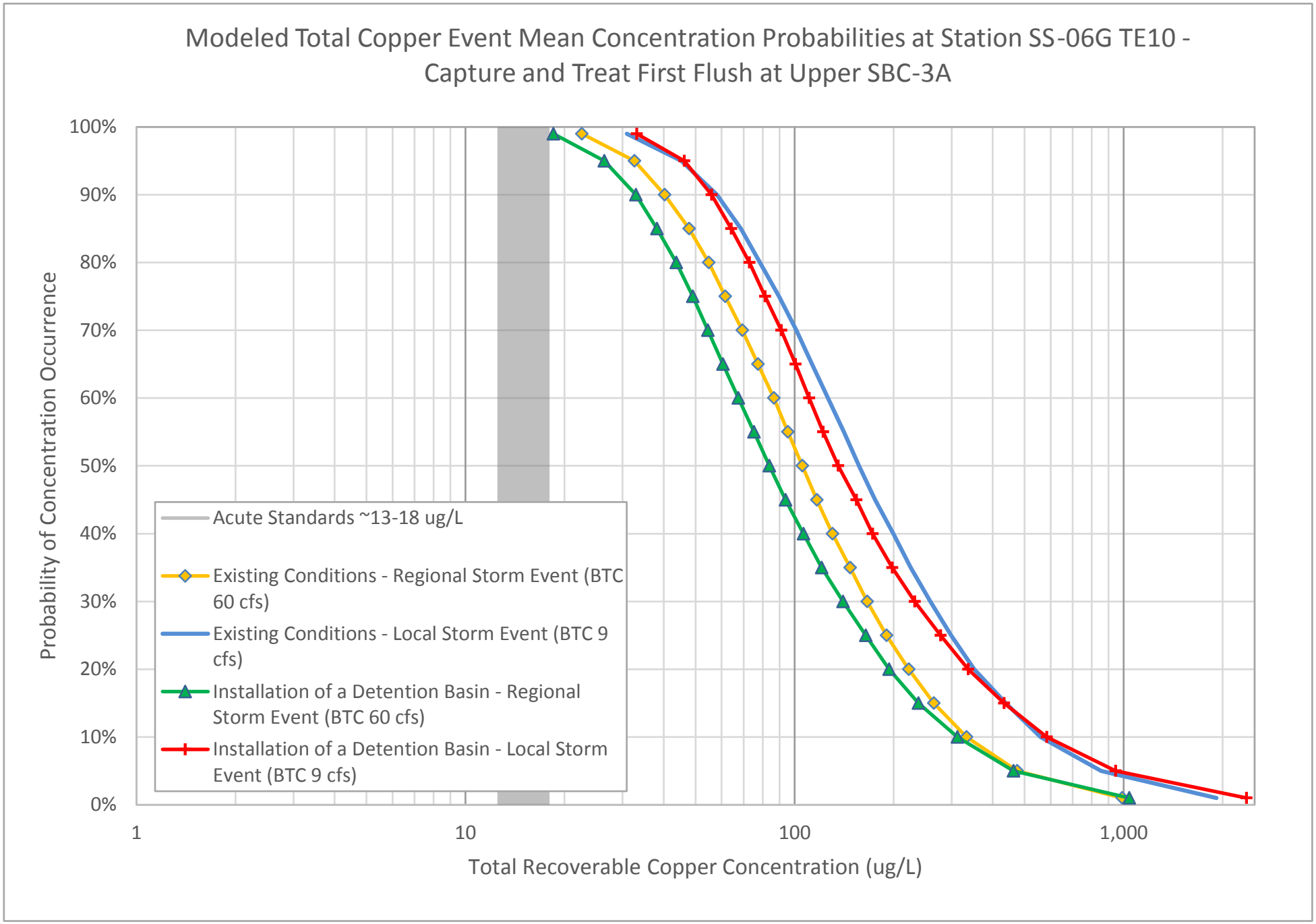


Figure E-101
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

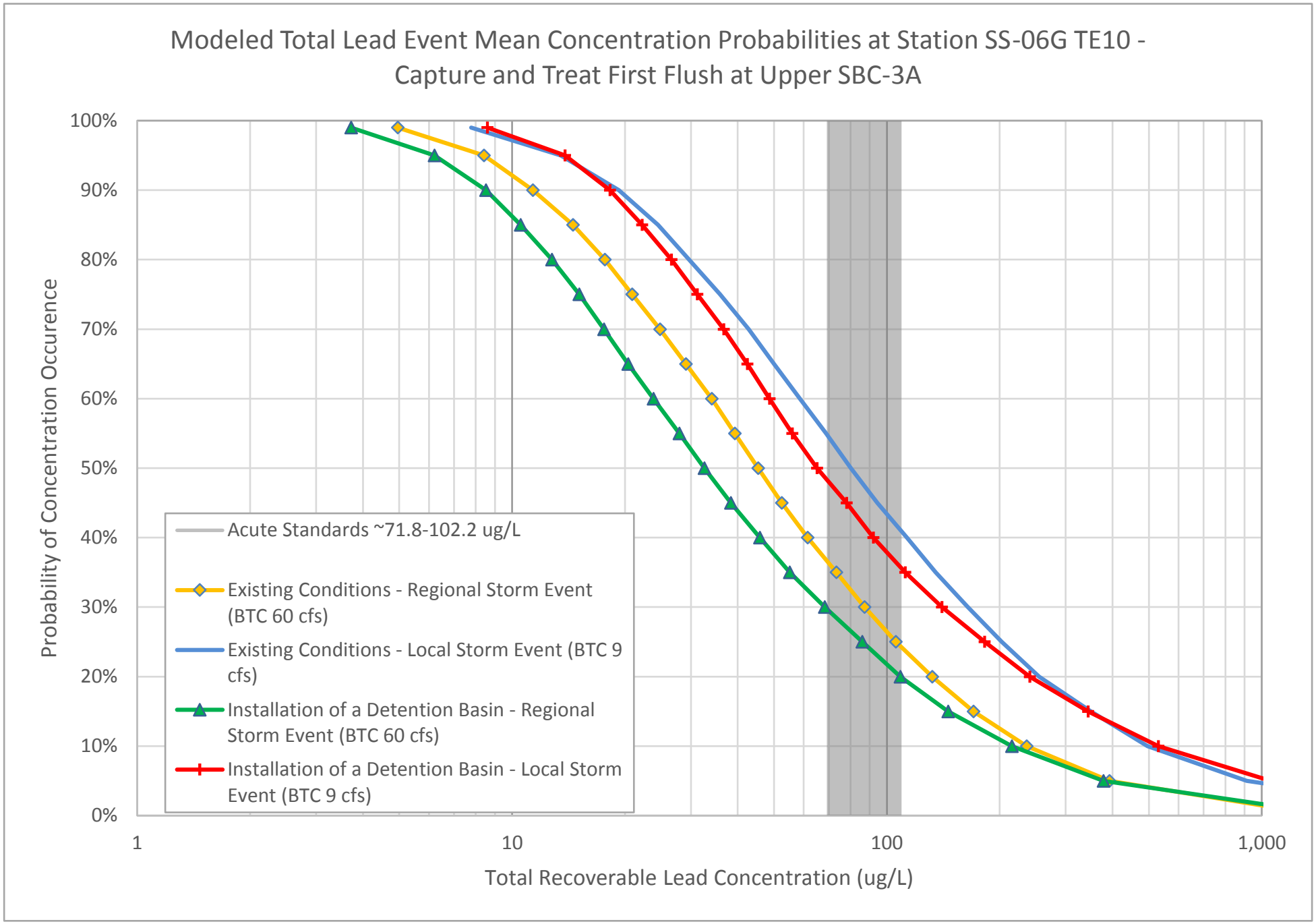


Figure E-102
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

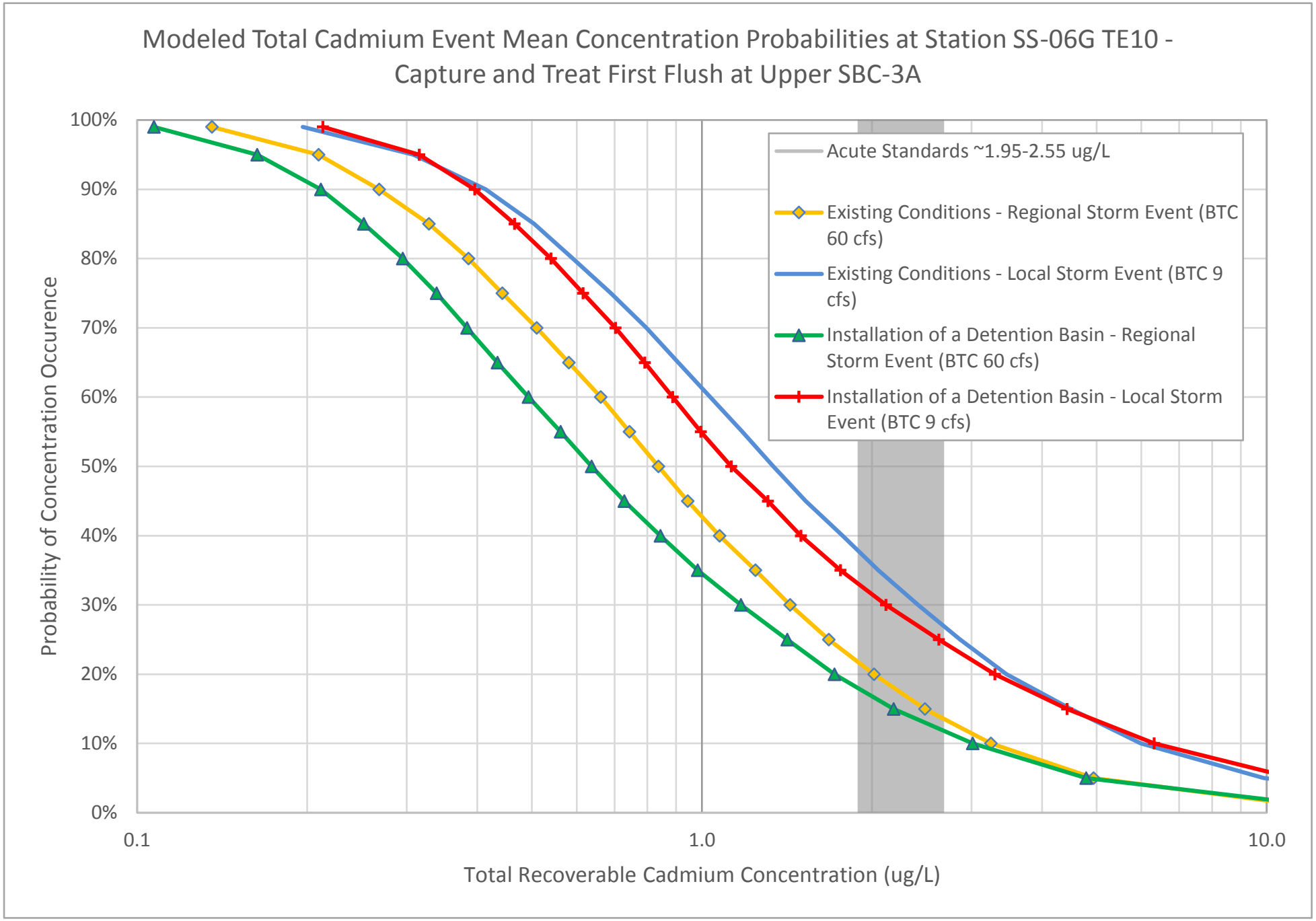


Figure E-103
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

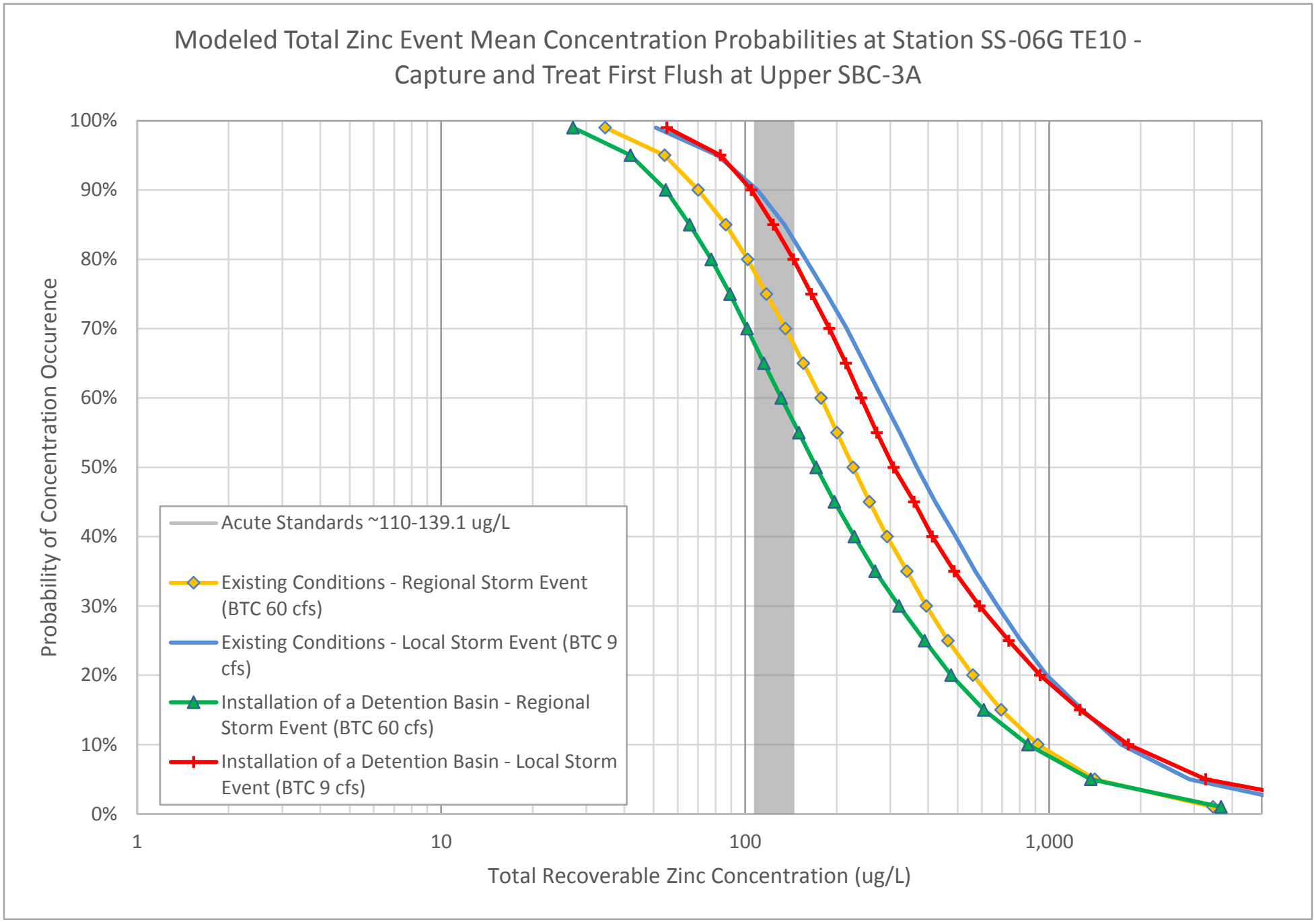


Figure E-104
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

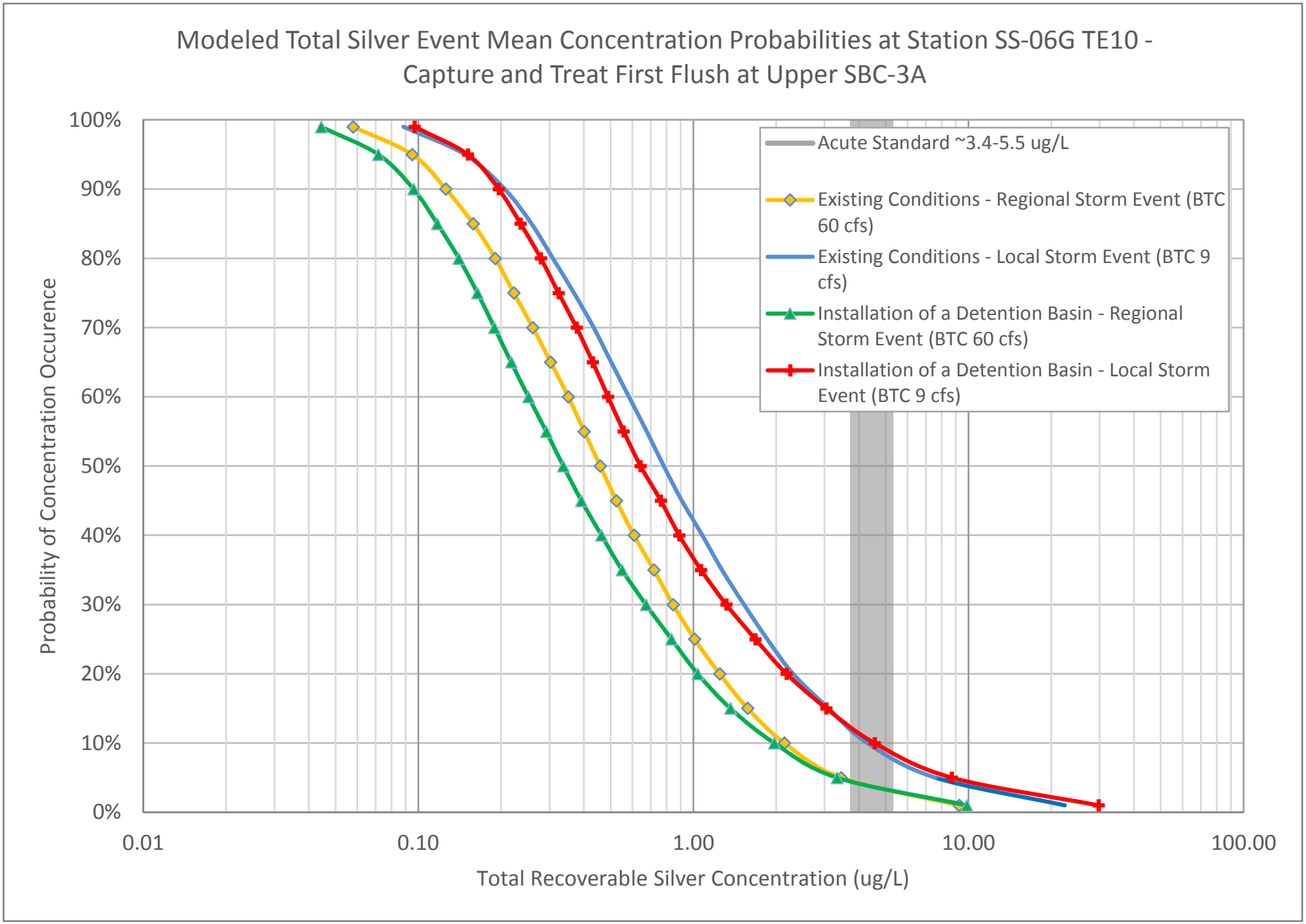


Figure E-105
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

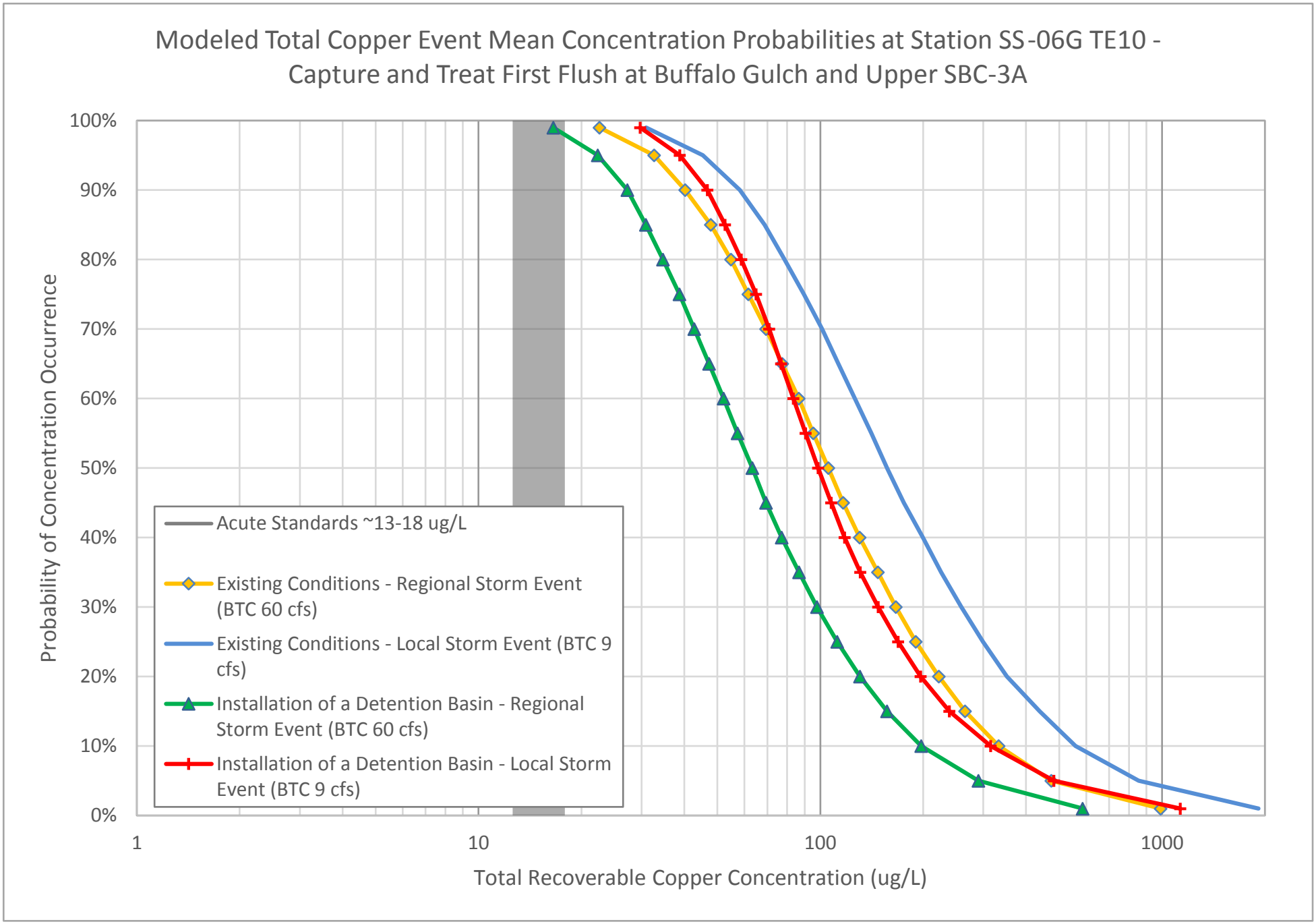


Figure E-106
Event Mean Concentration Results

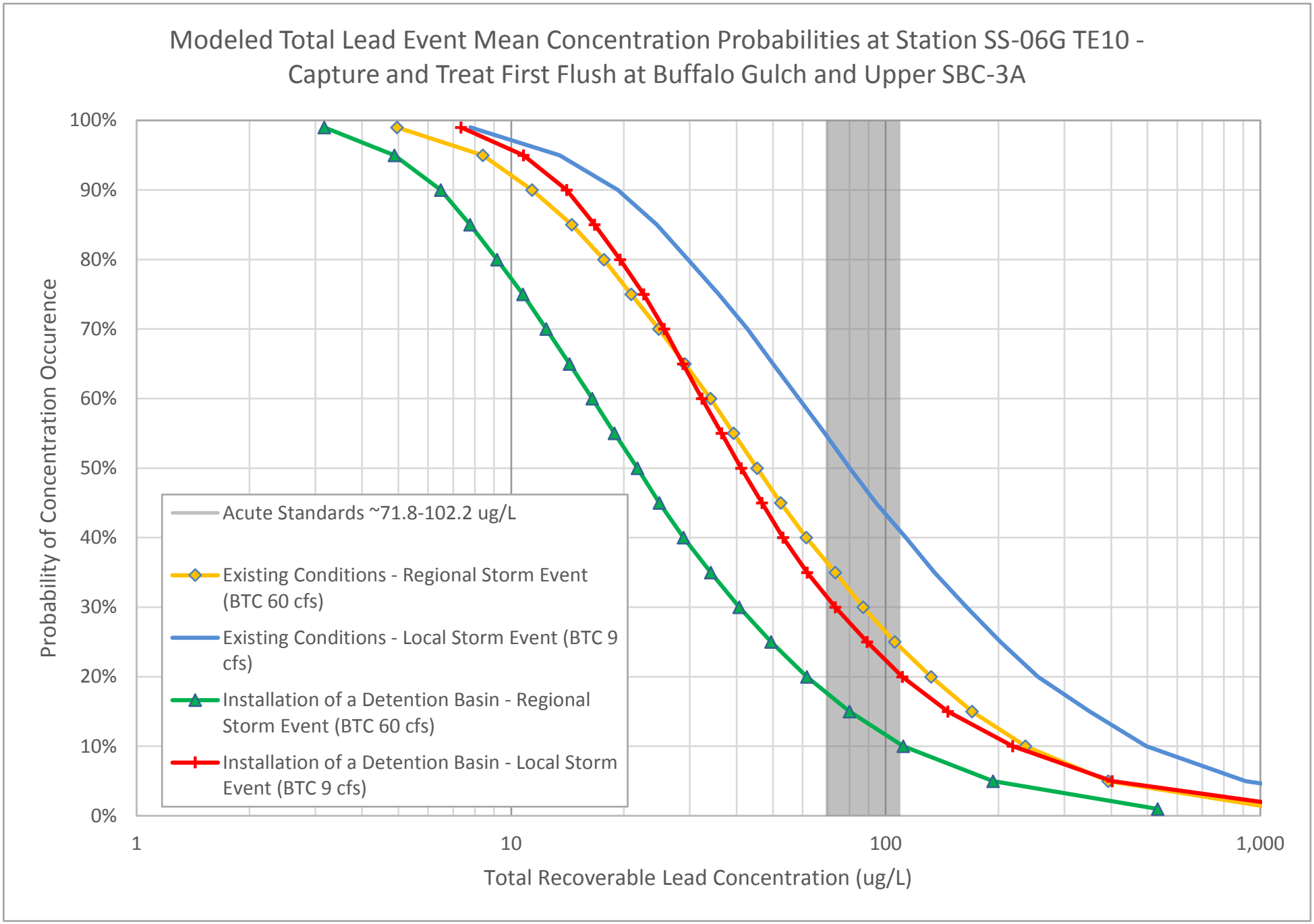


Figure E-107
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

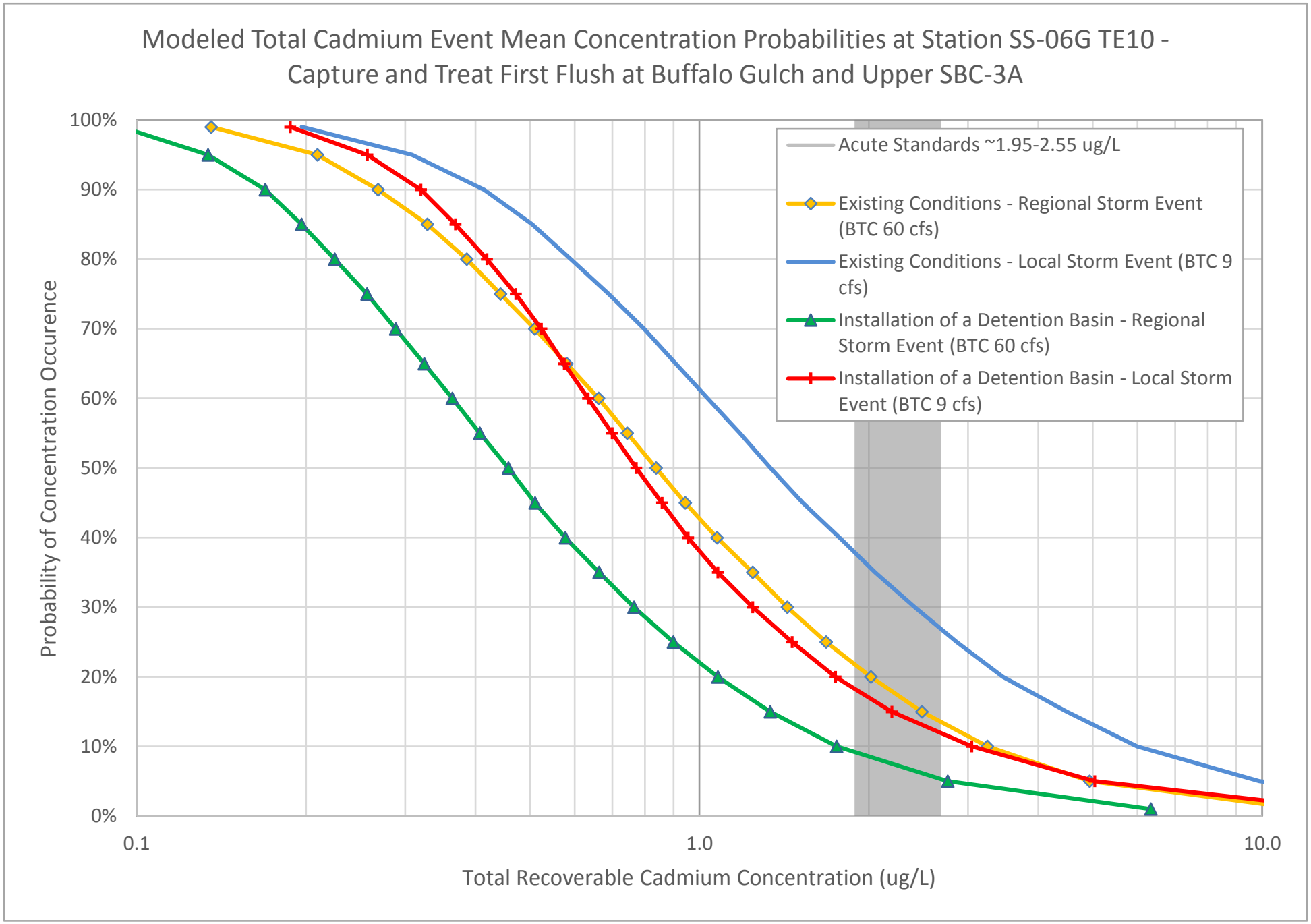


Figure E-108
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

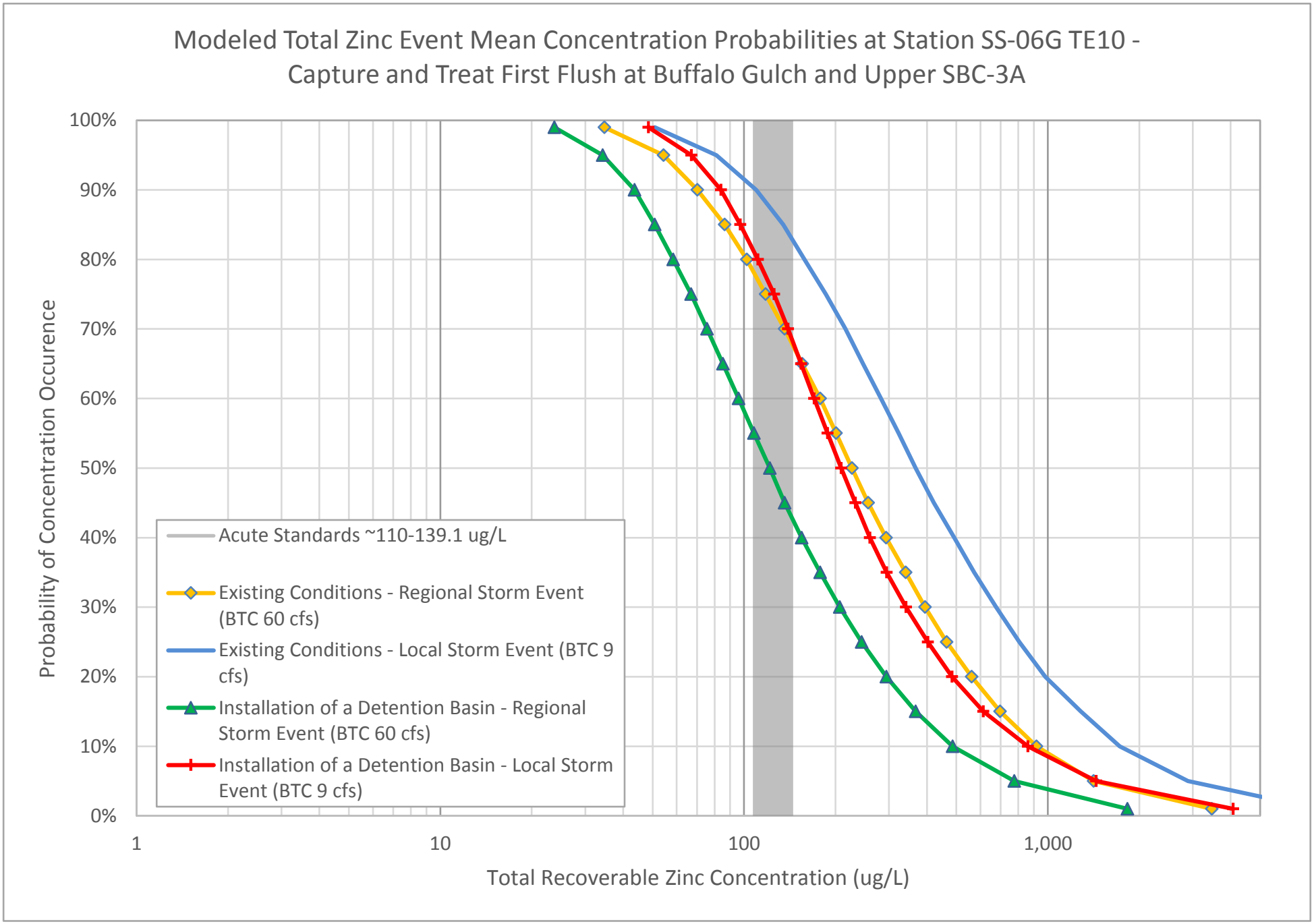


Figure E-109
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

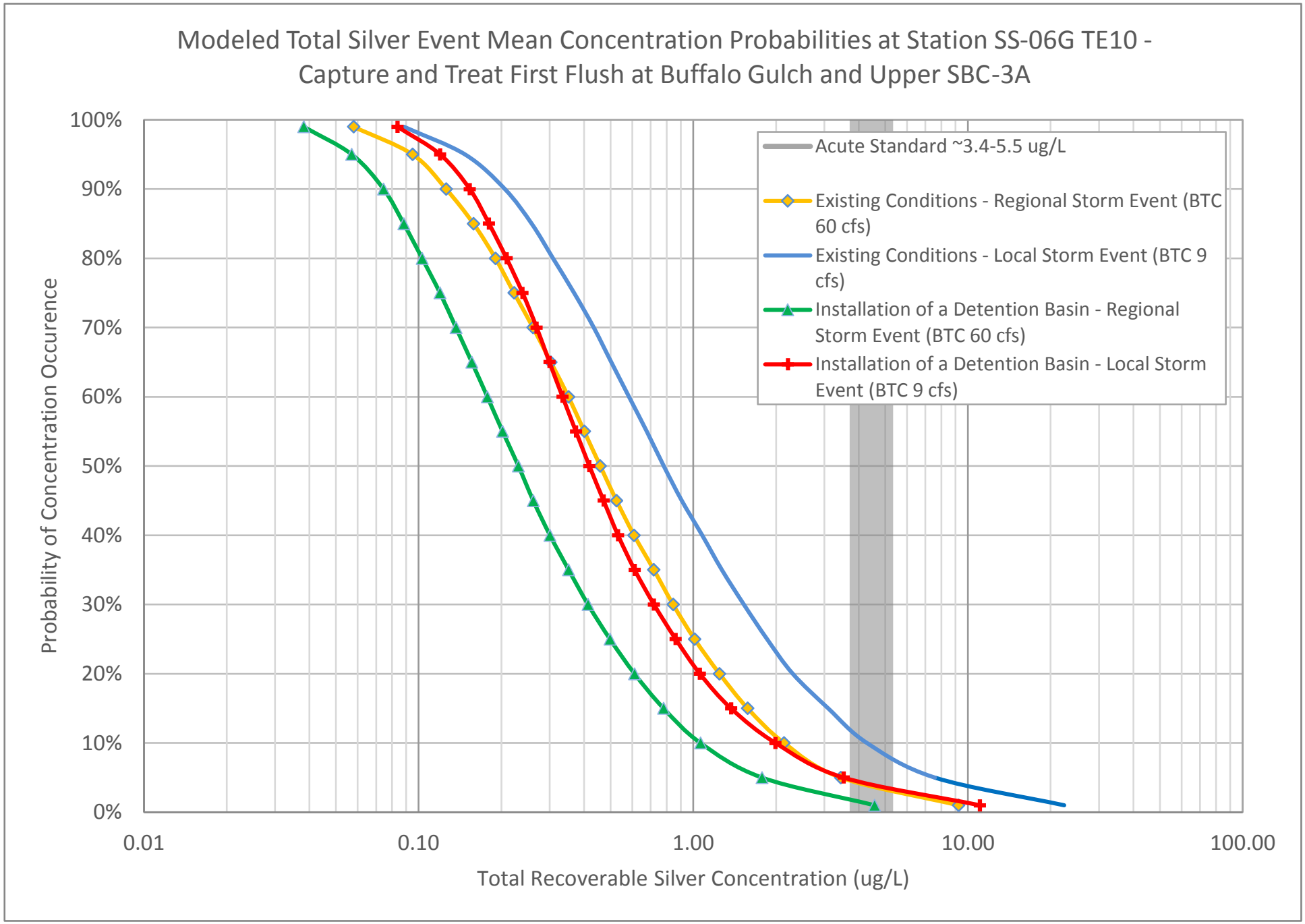


Figure E-110
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

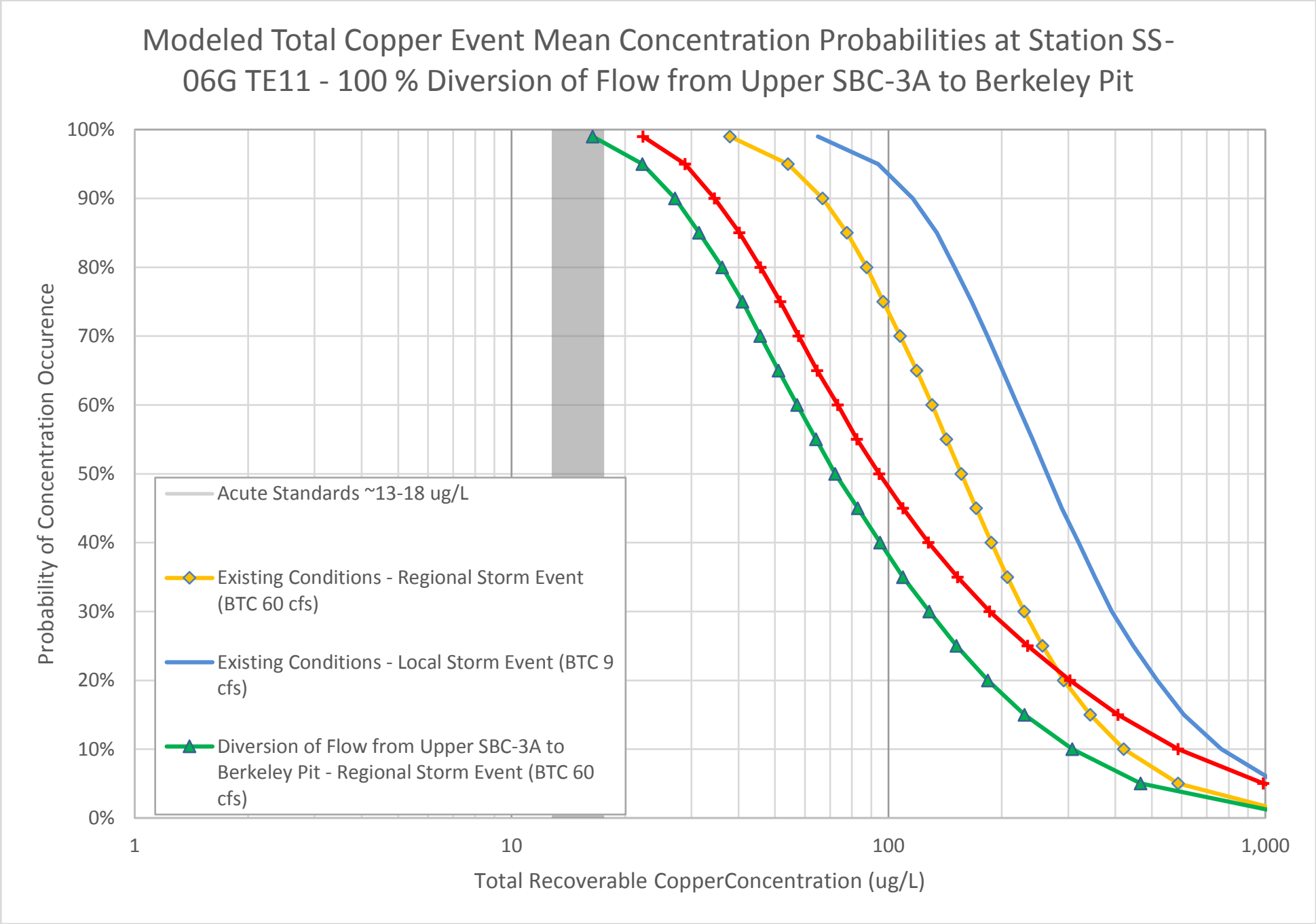


Figure E-111
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

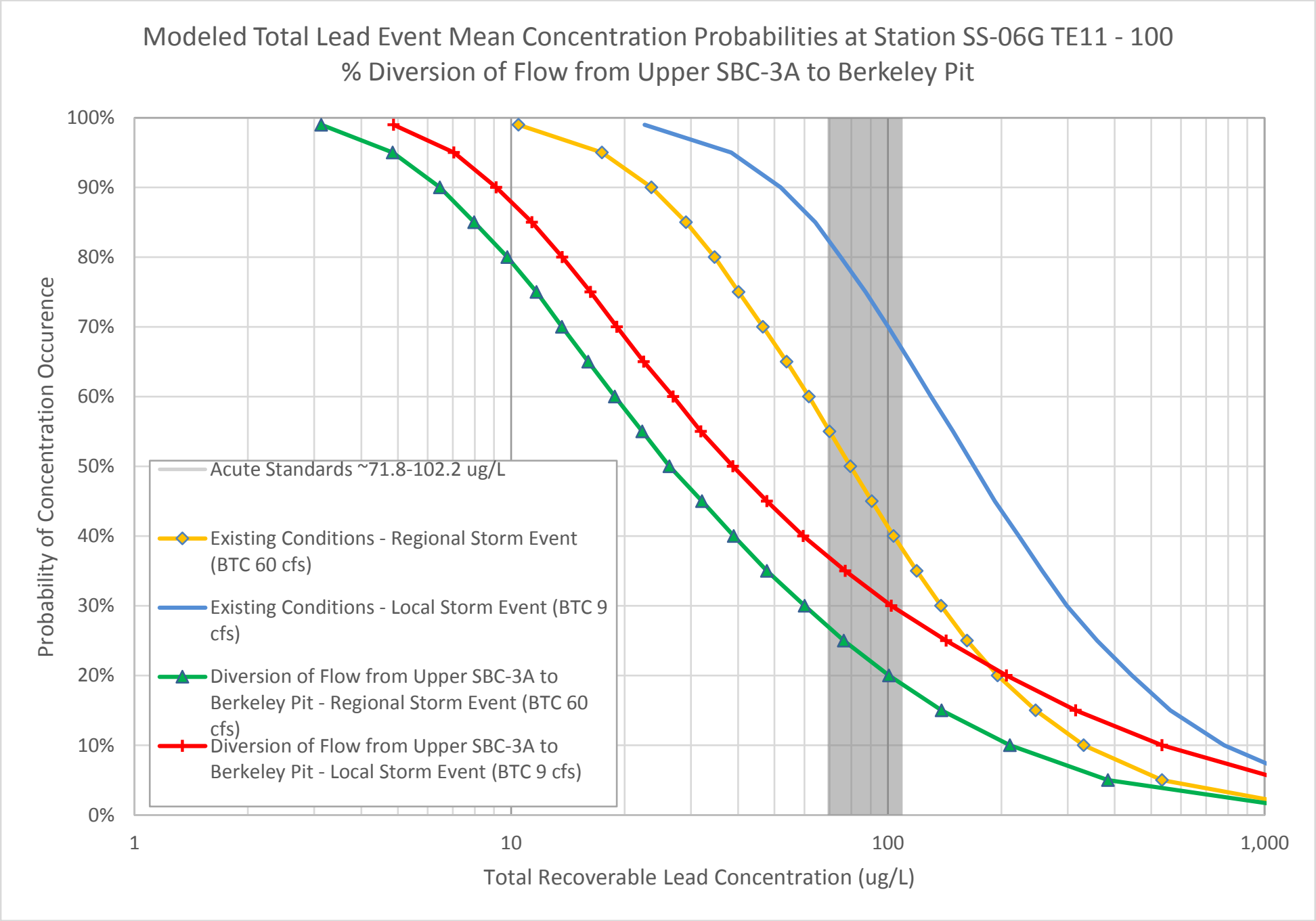


Figure E-112
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

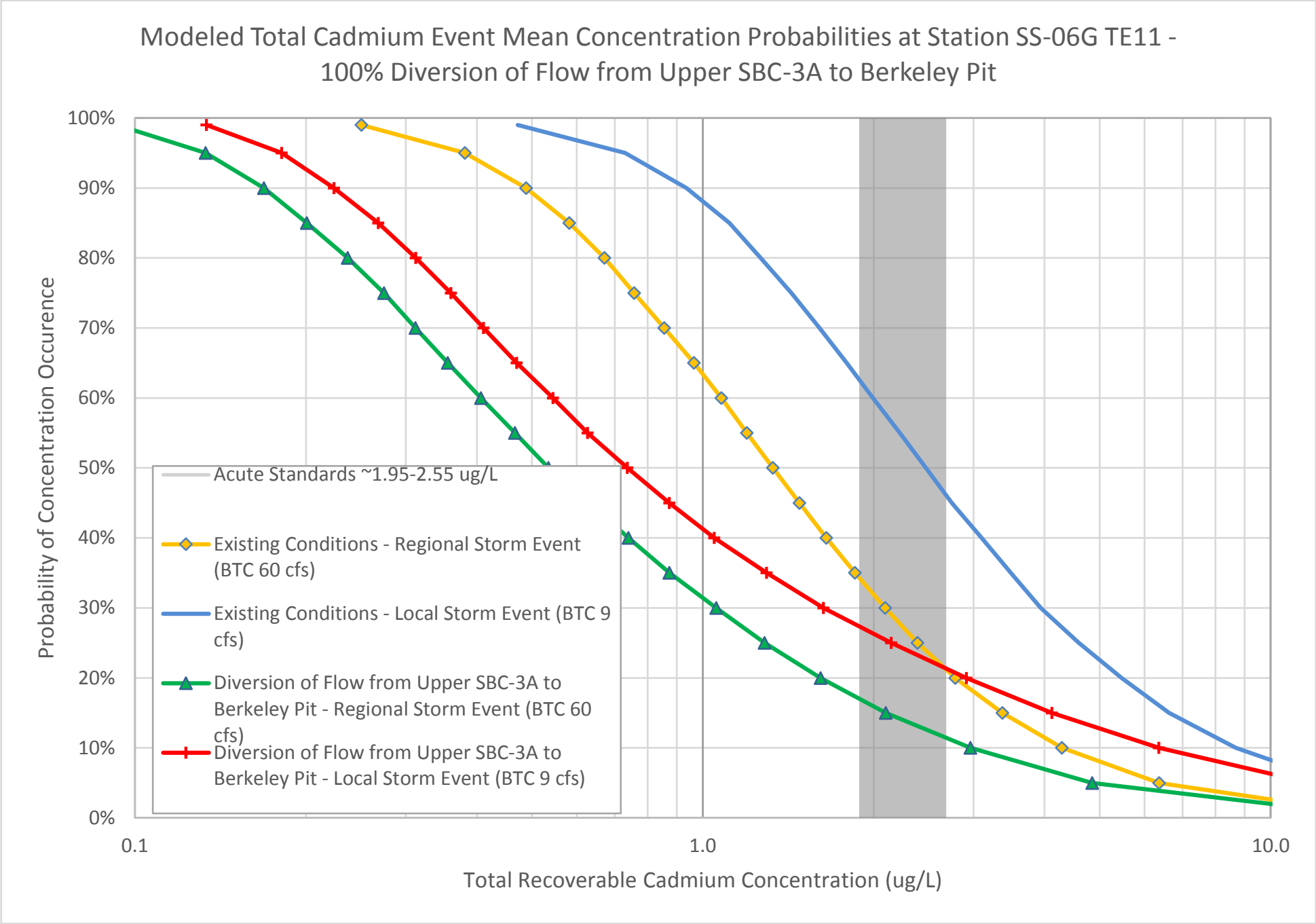


Figure E-113
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

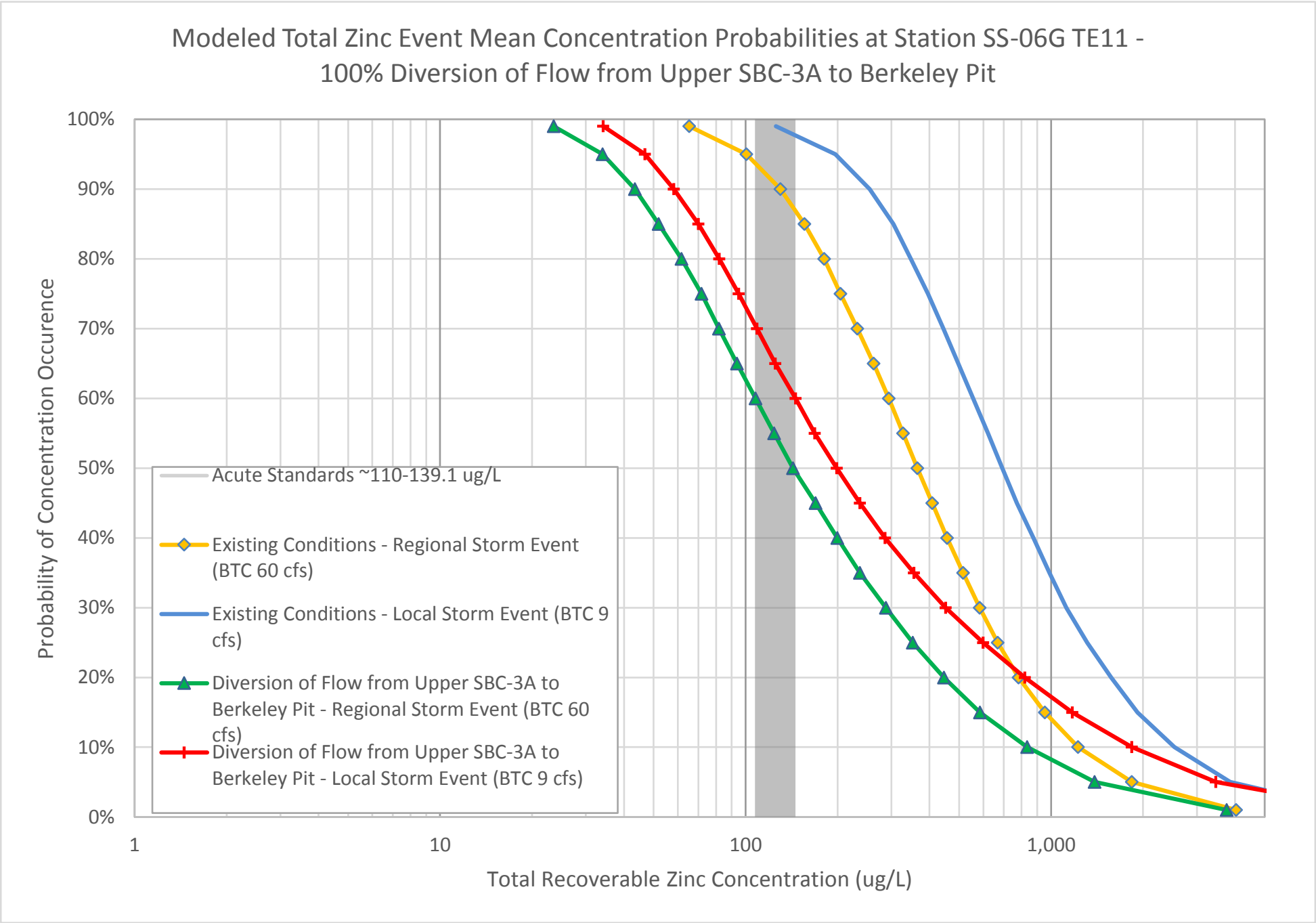


Figure E-114
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

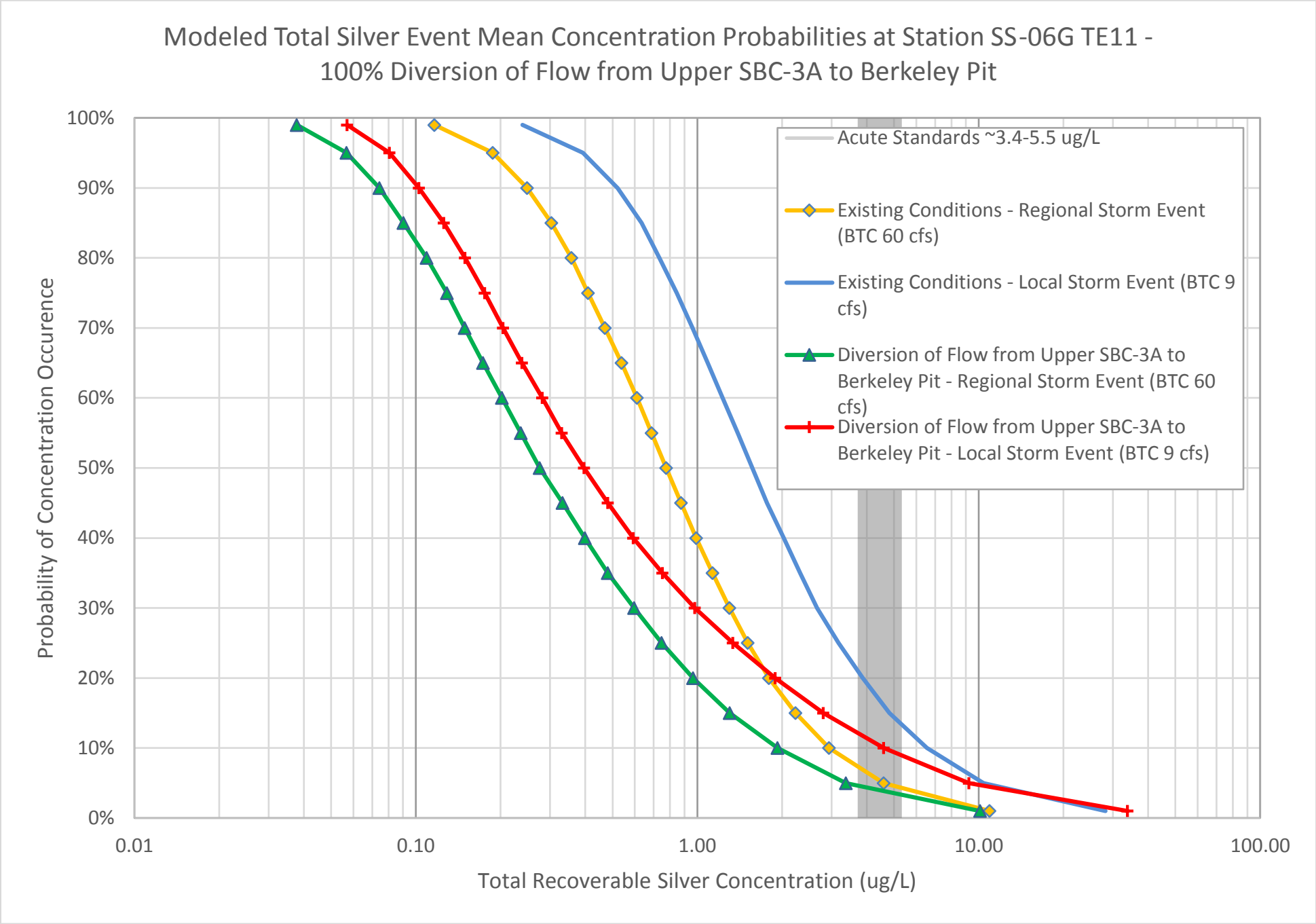


Figure E-115
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

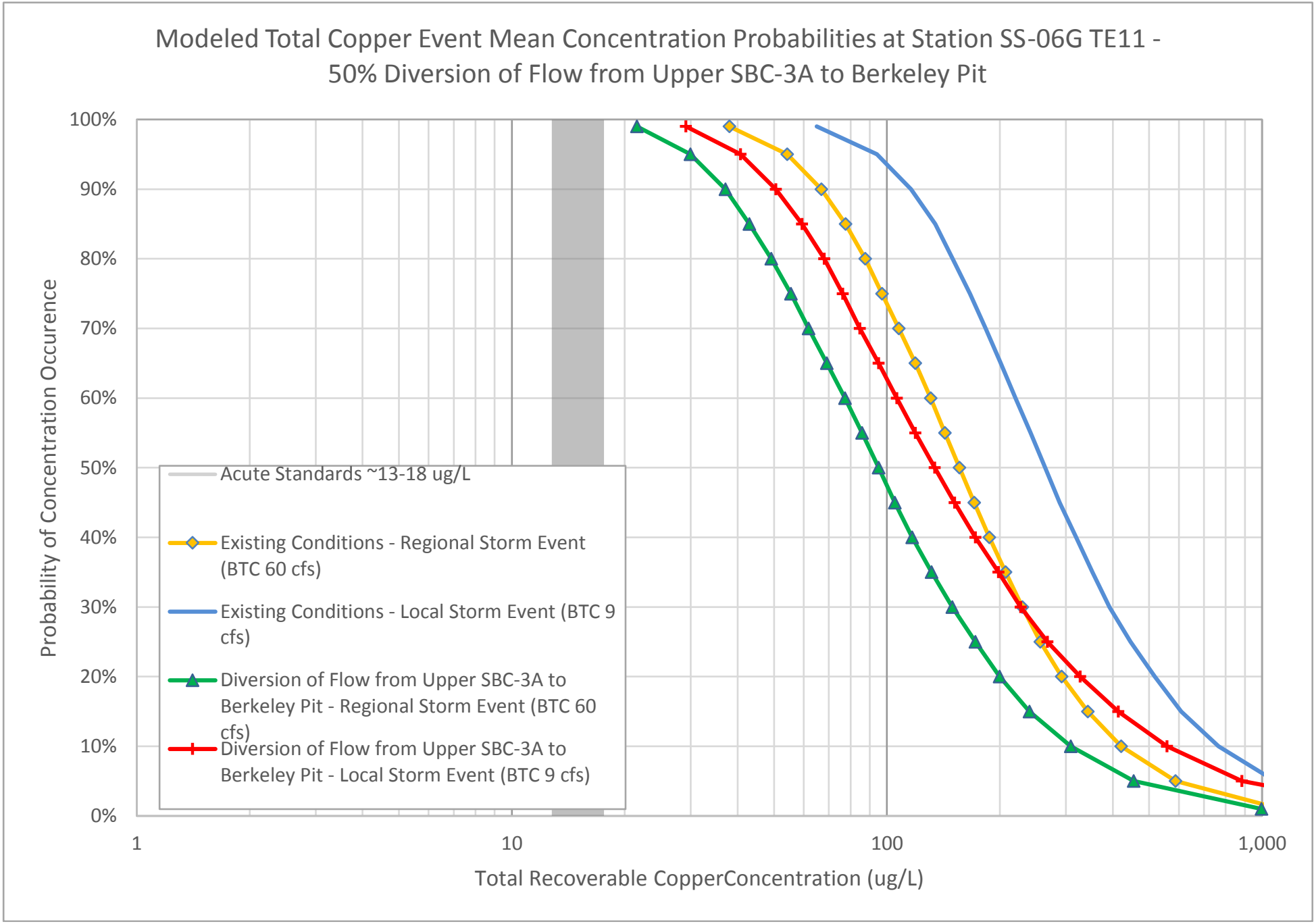


Figure E-116
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

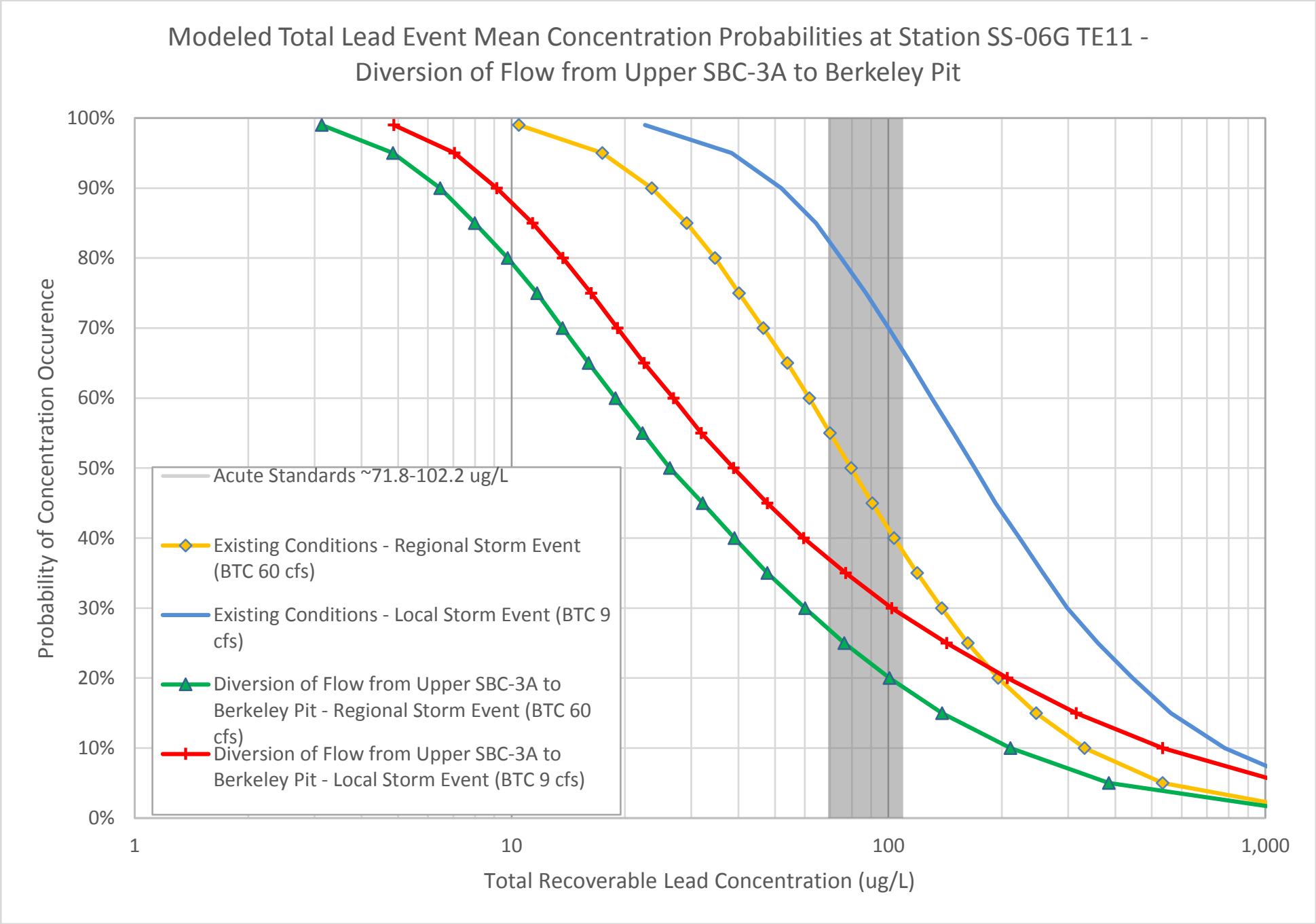


Figure E-117
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

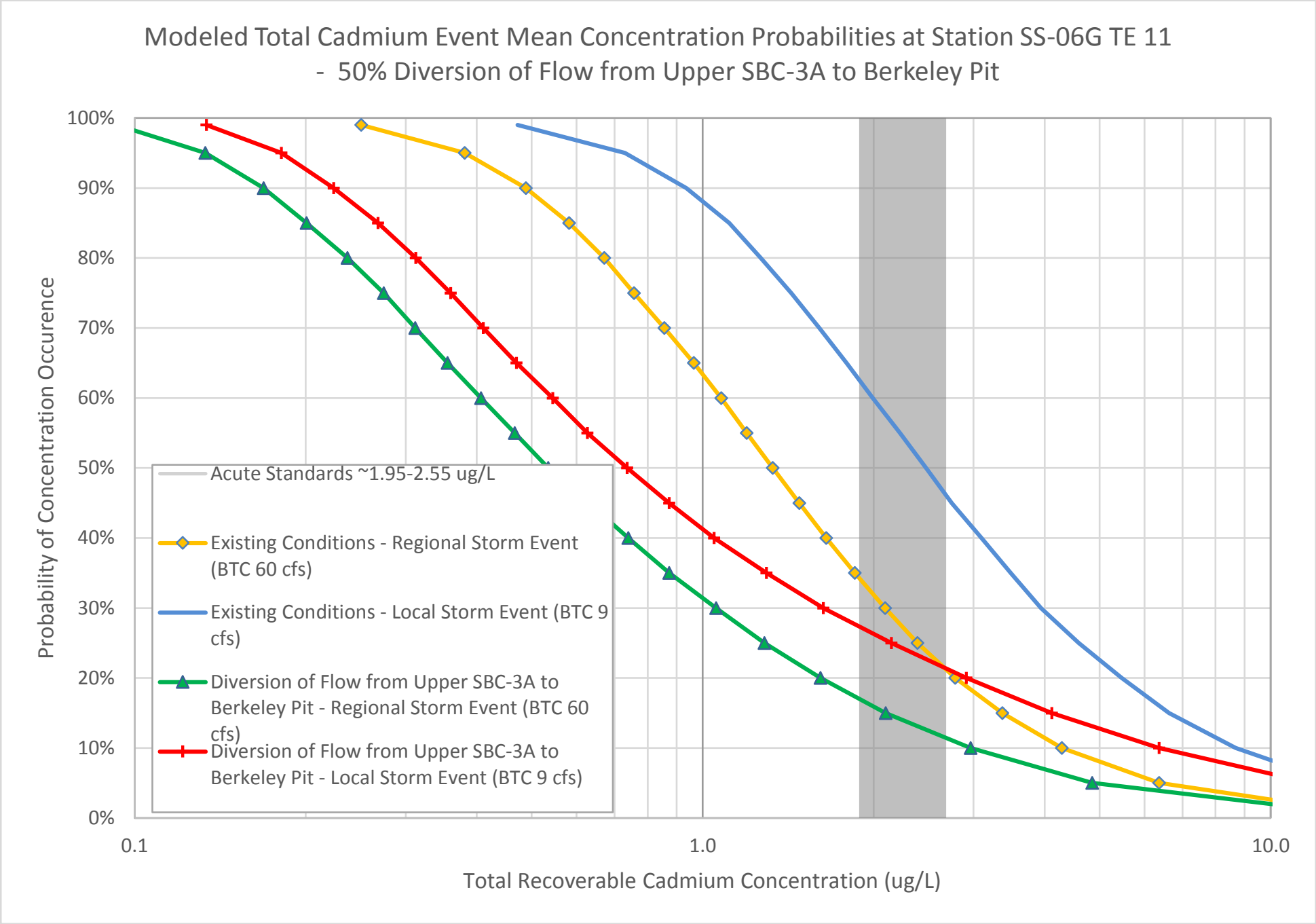


Figure E-118
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

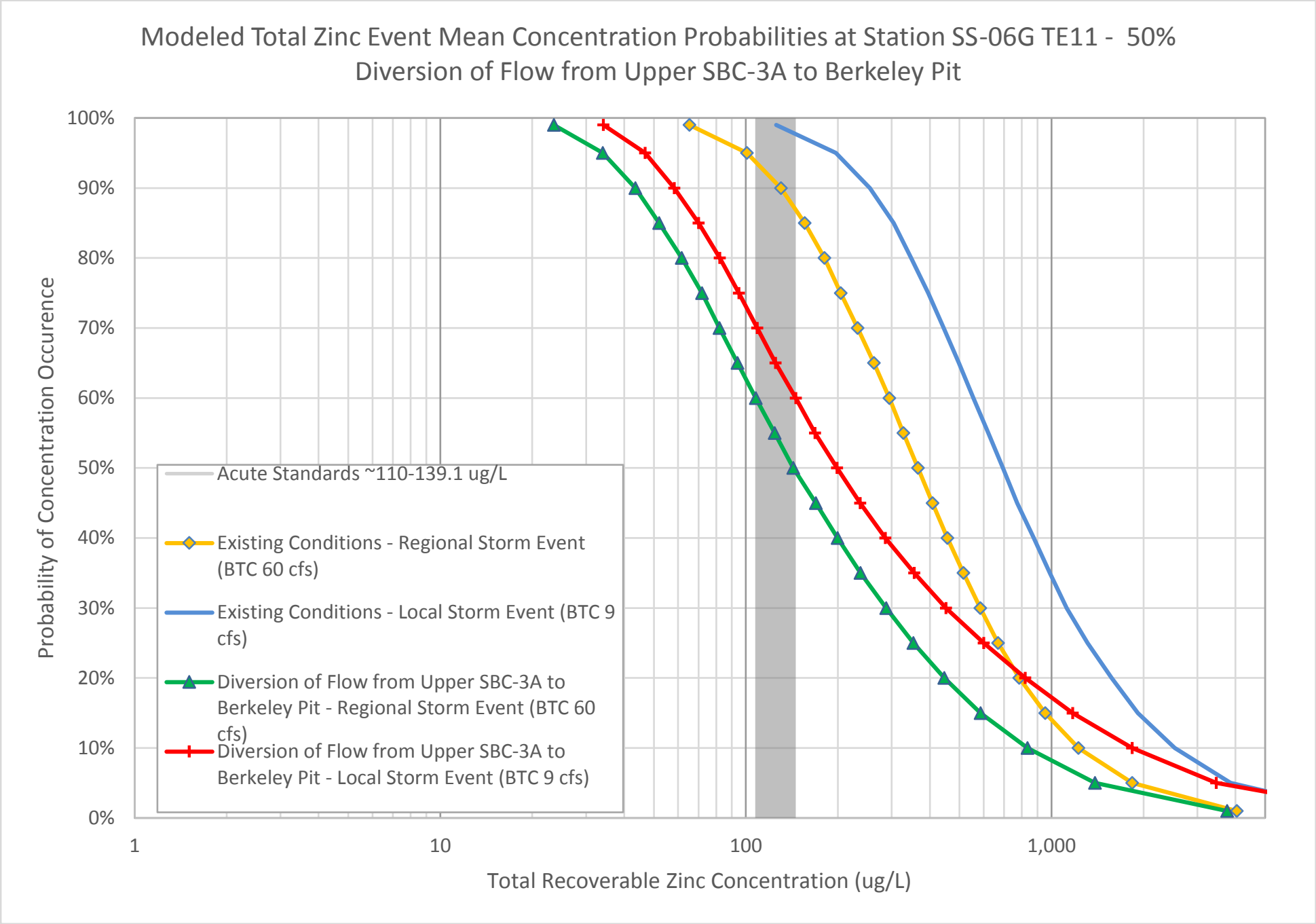


Figure E-119
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

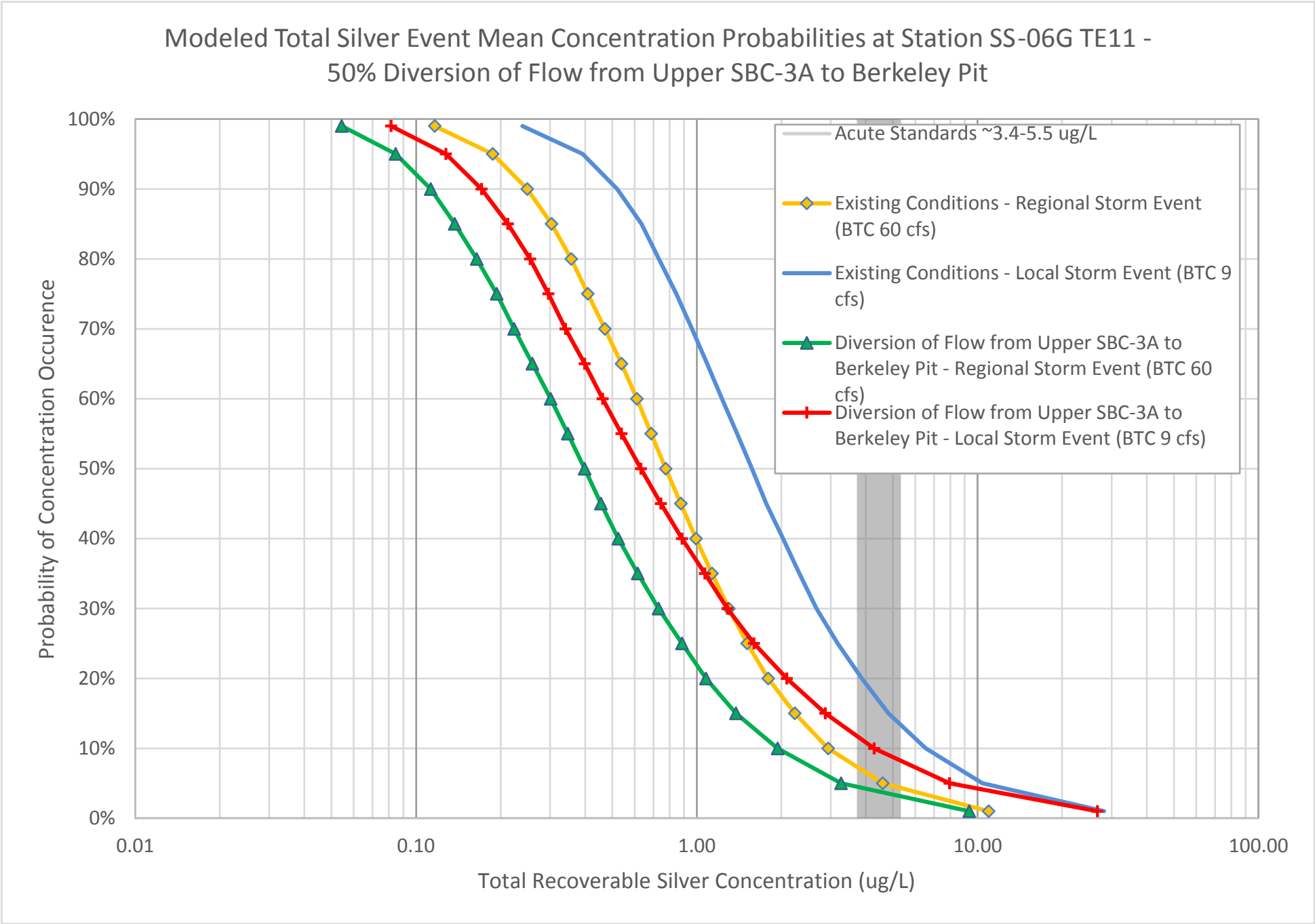


Figure E-120
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

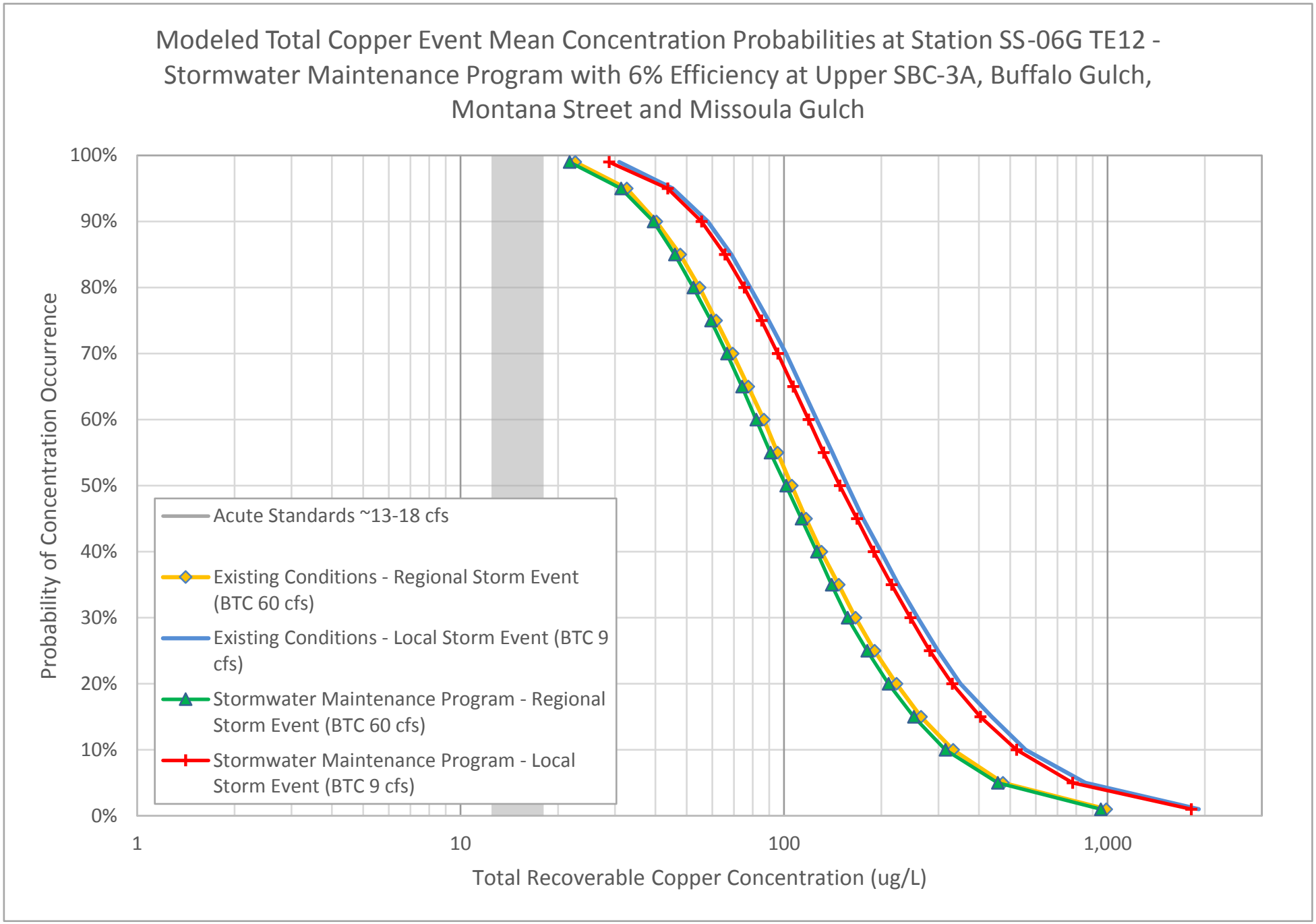


Figure E-121
Event Mean Concentration Results

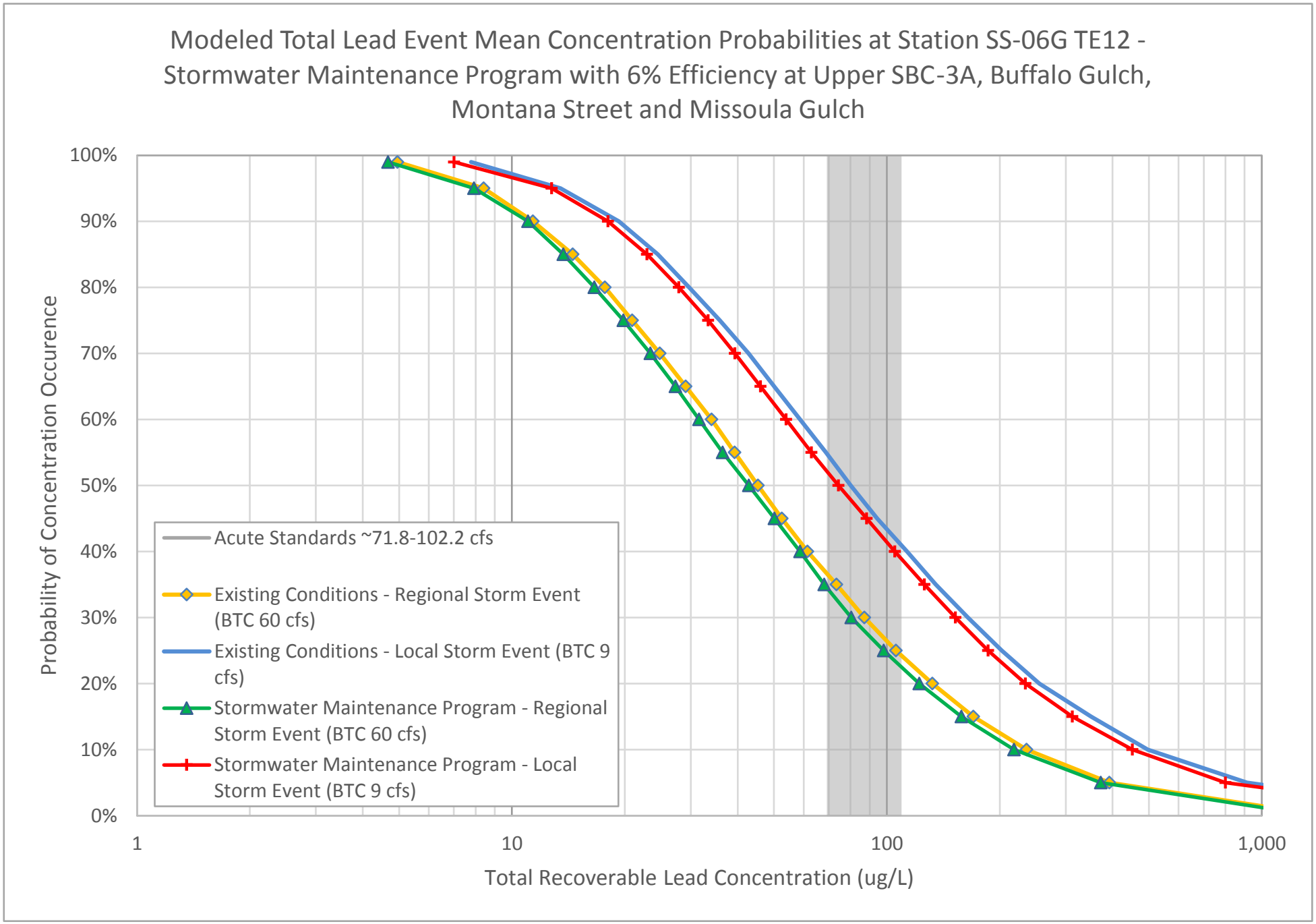


Figure E-122
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

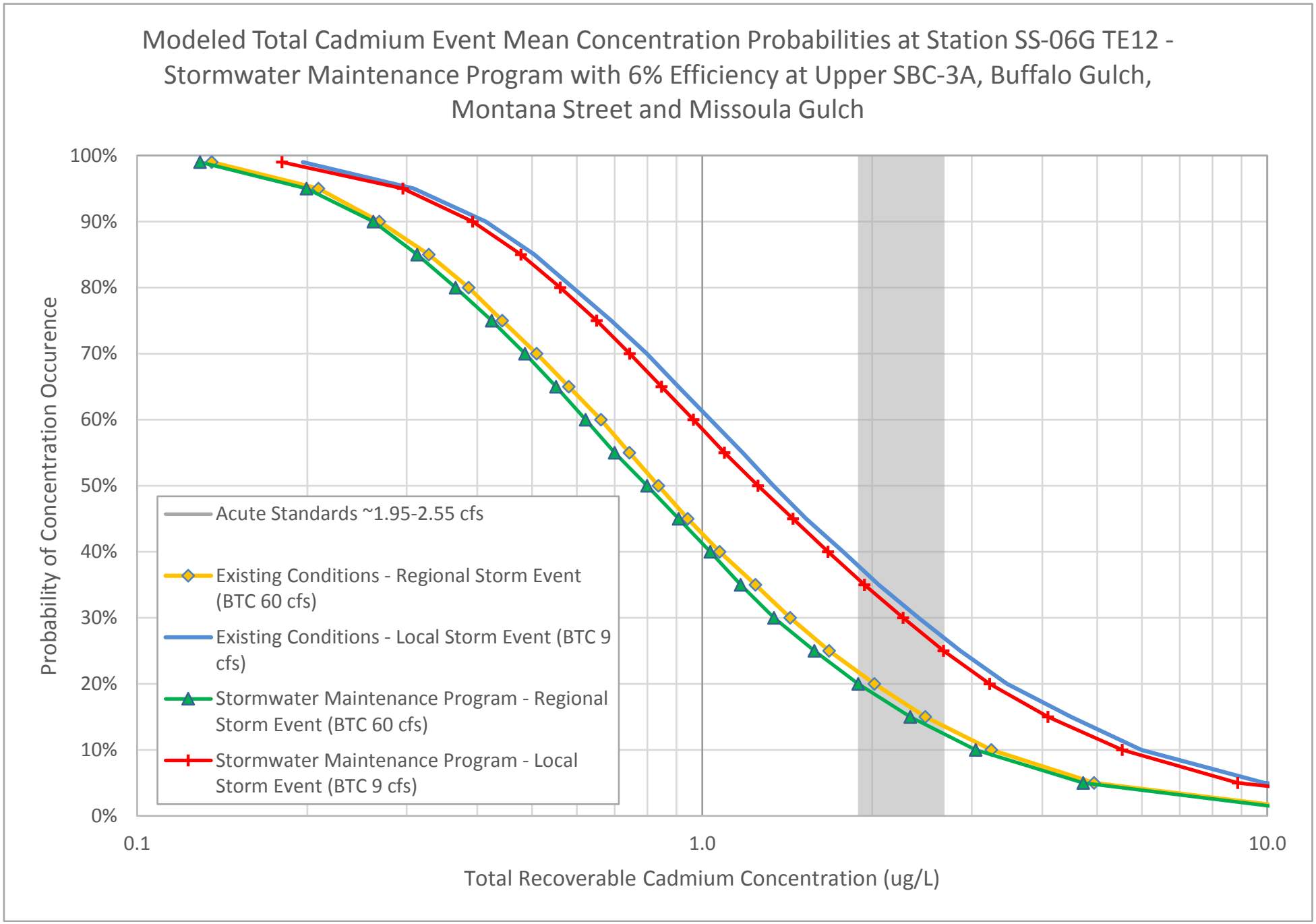


Figure E-123
Event Mean Concentration Results

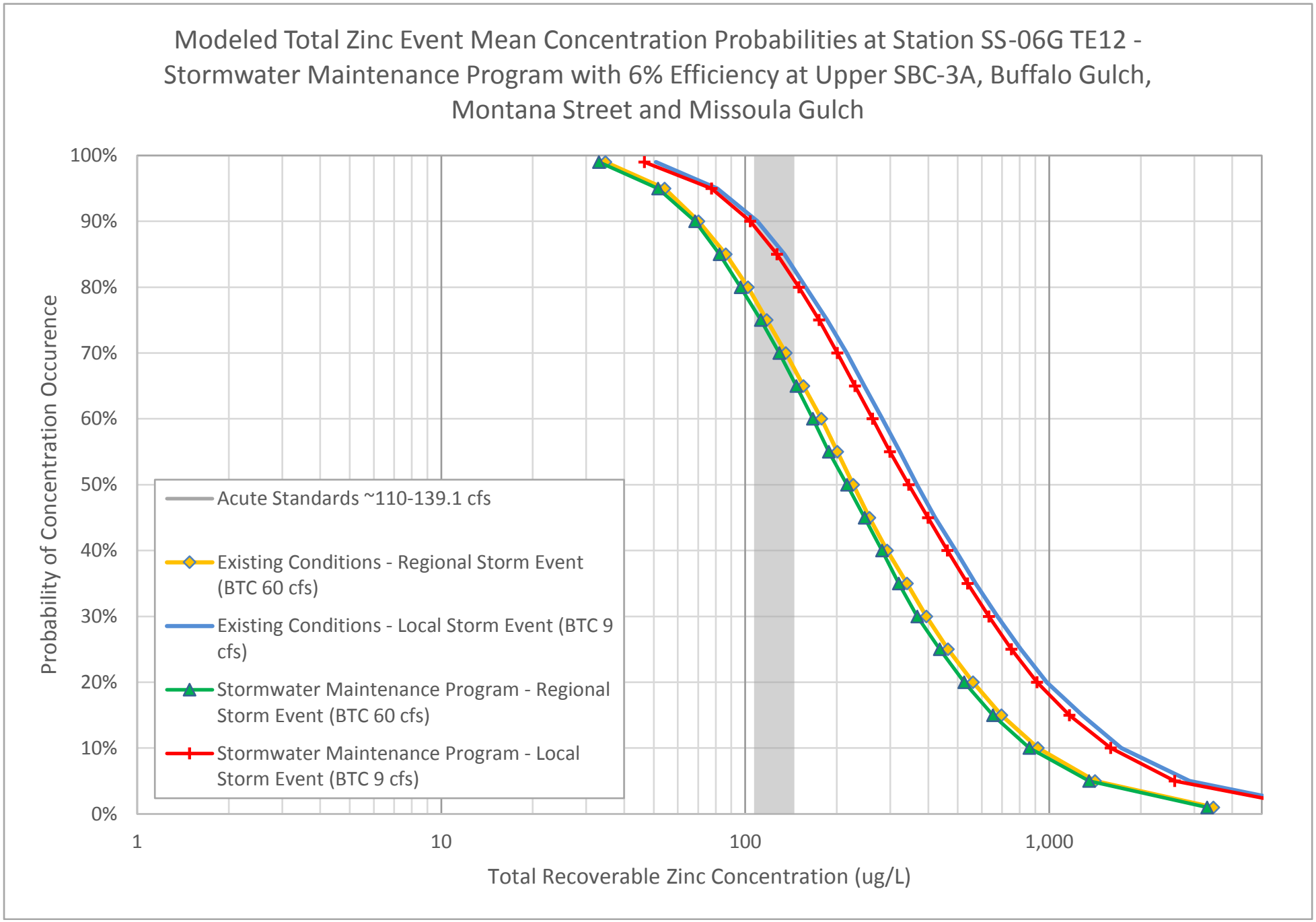


Figure E-124
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

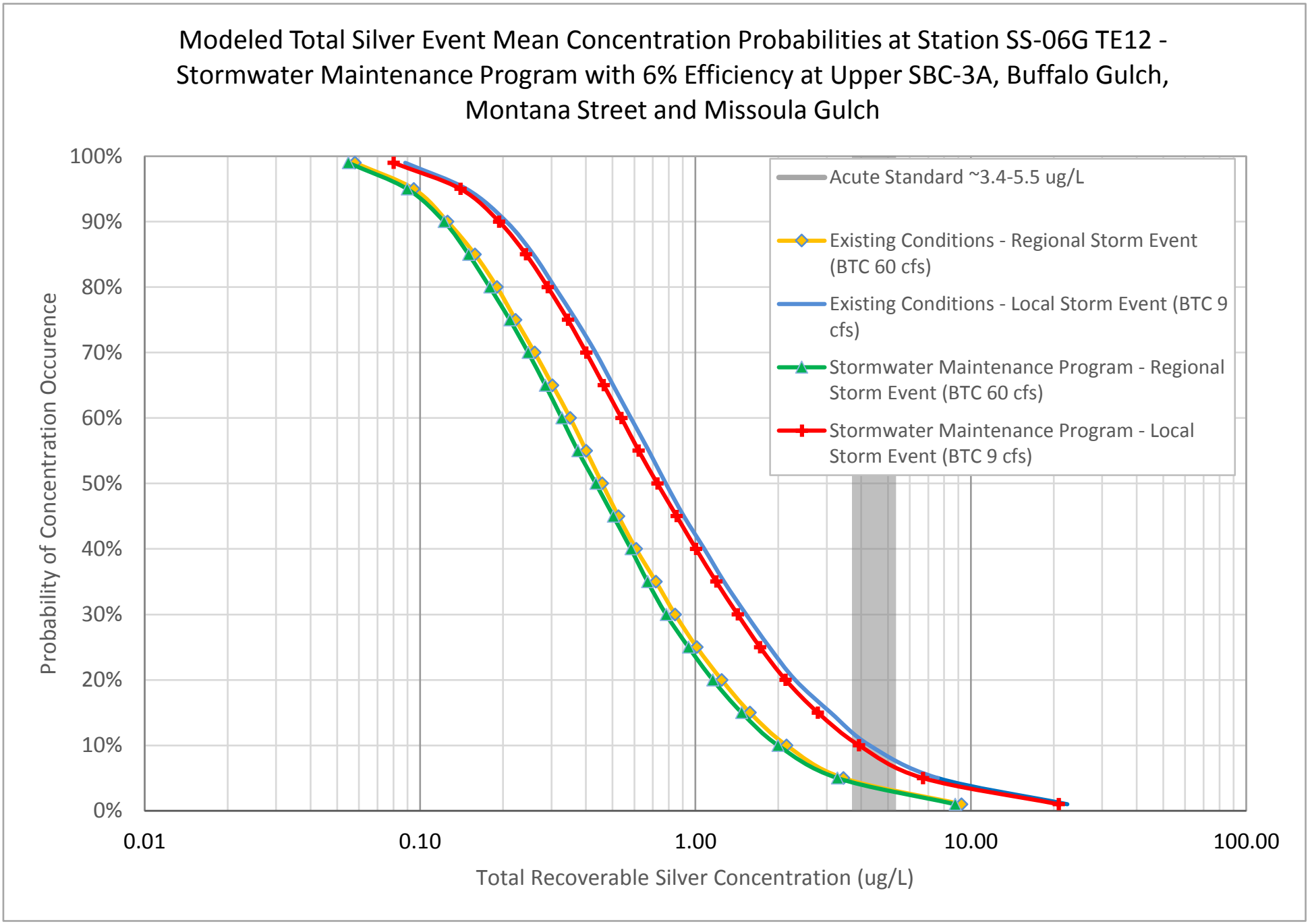


Figure E-125
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

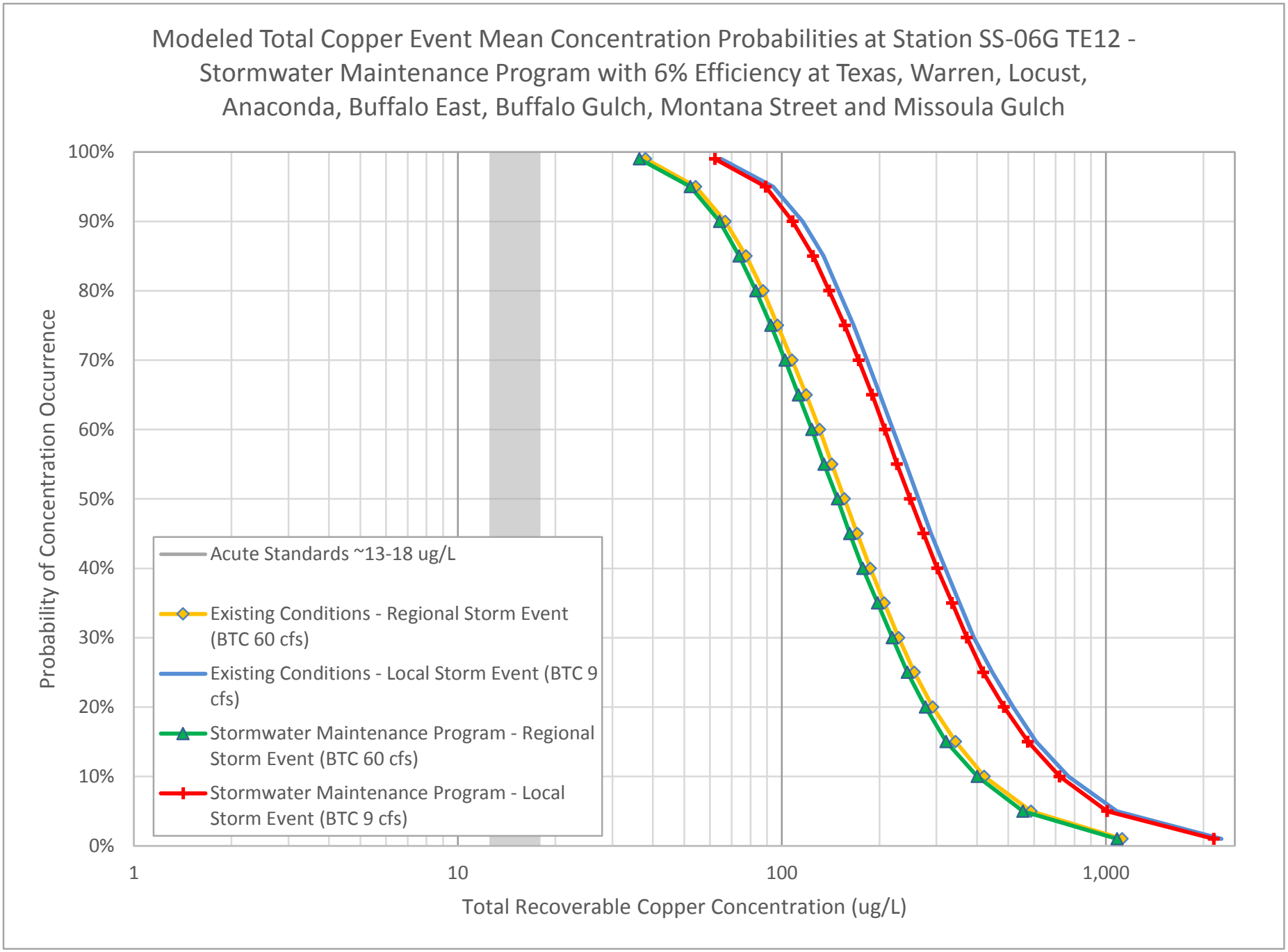


Figure E-126
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

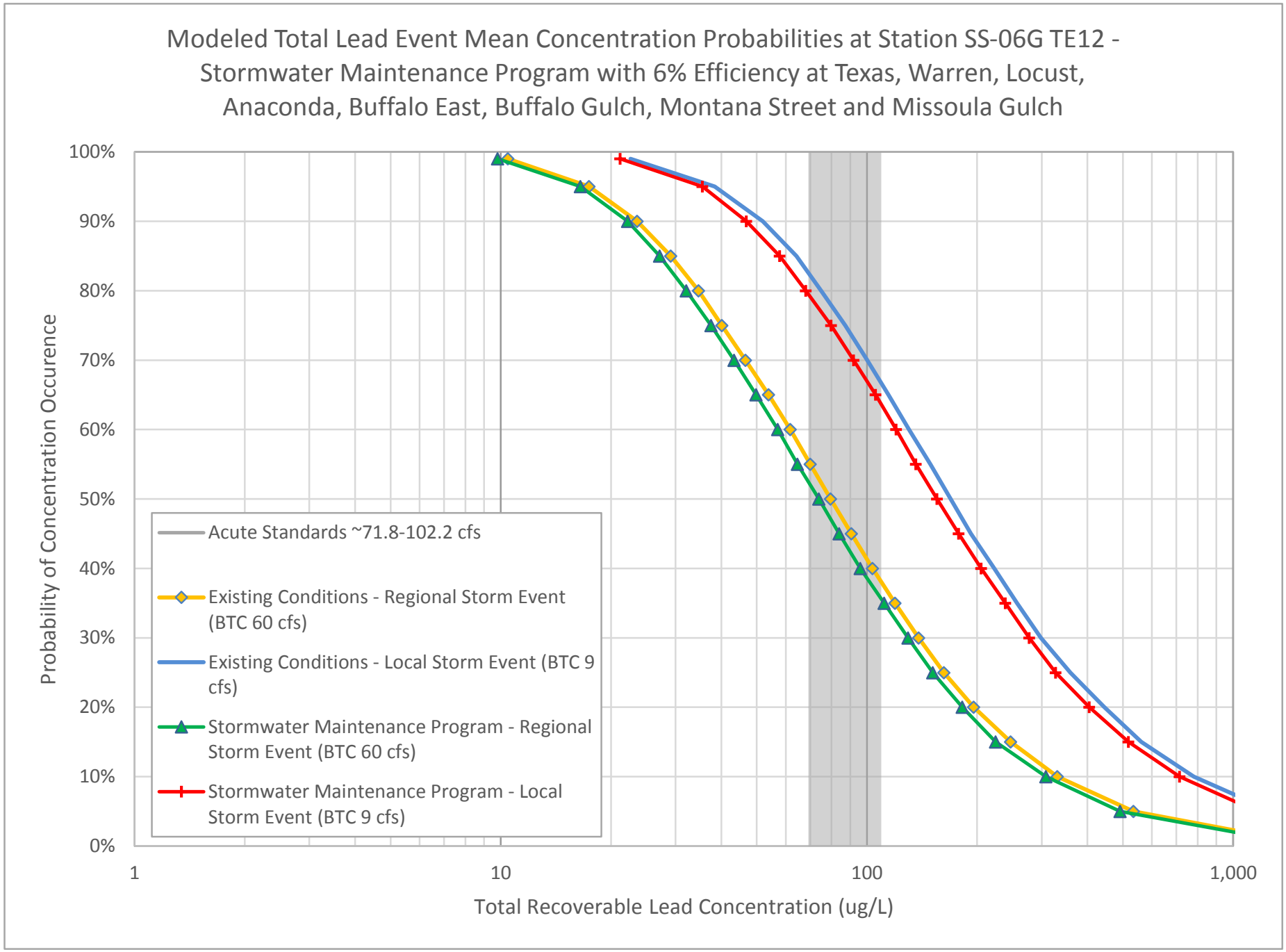


Figure E-127
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

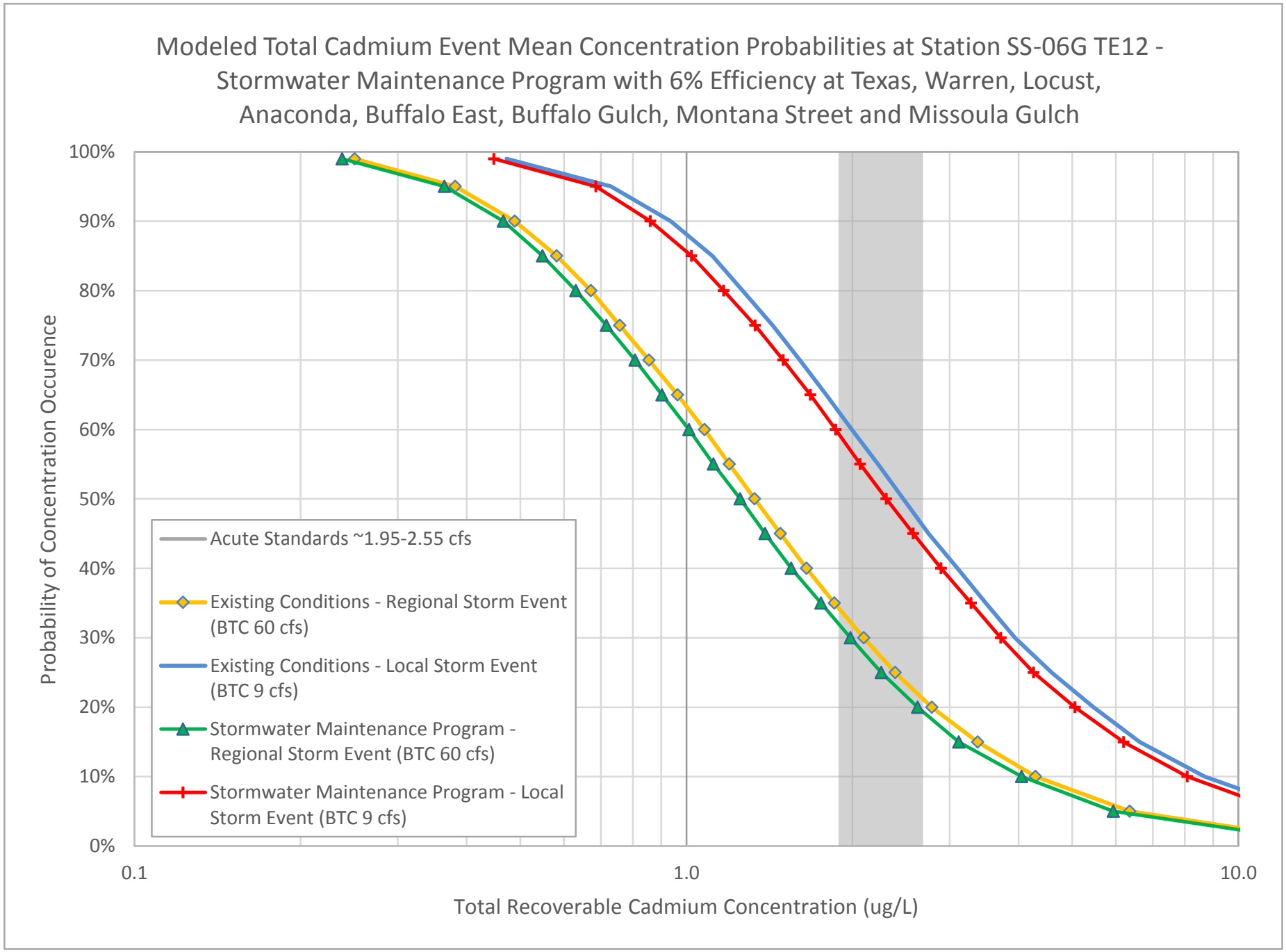


Figure E-128
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

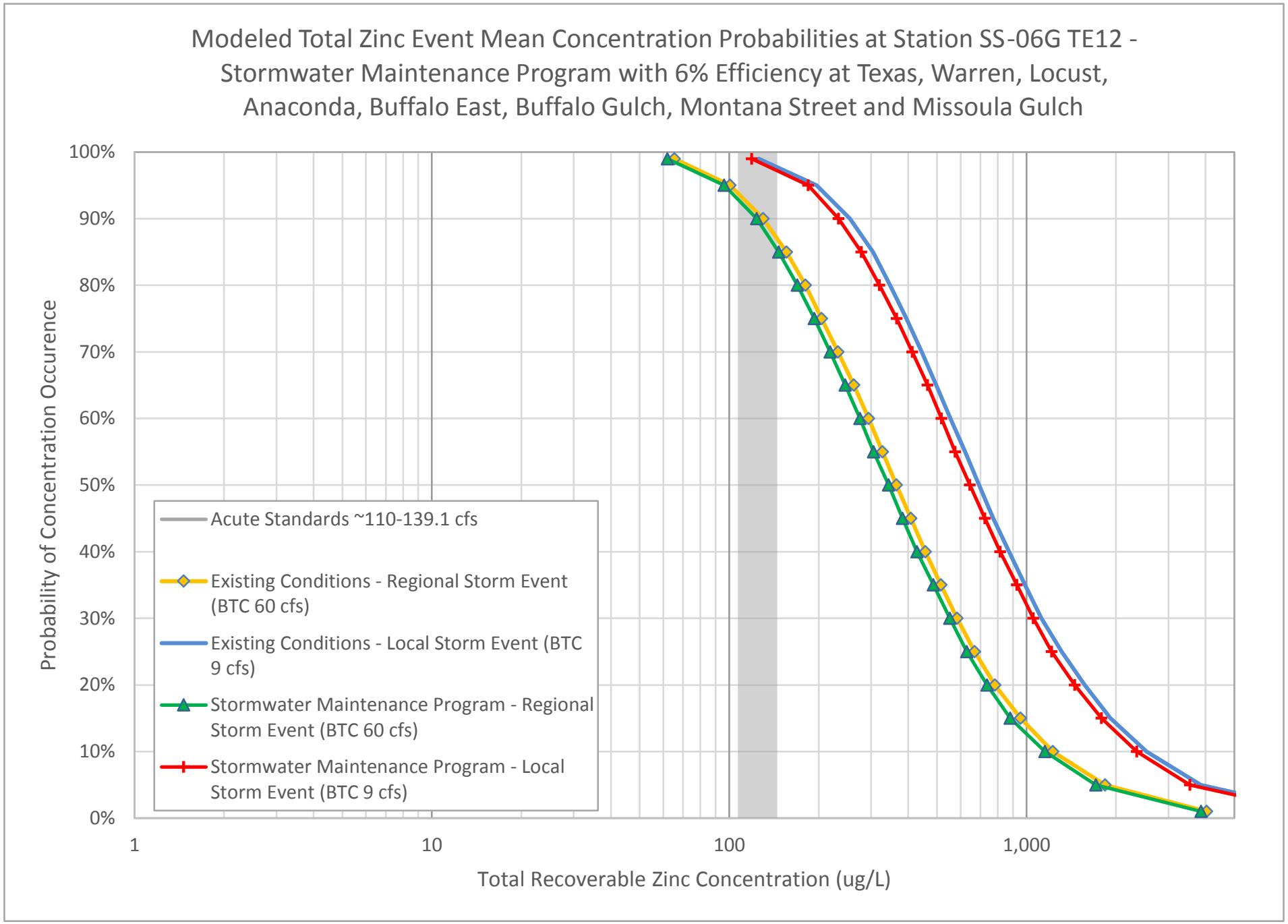


Figure E-129
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

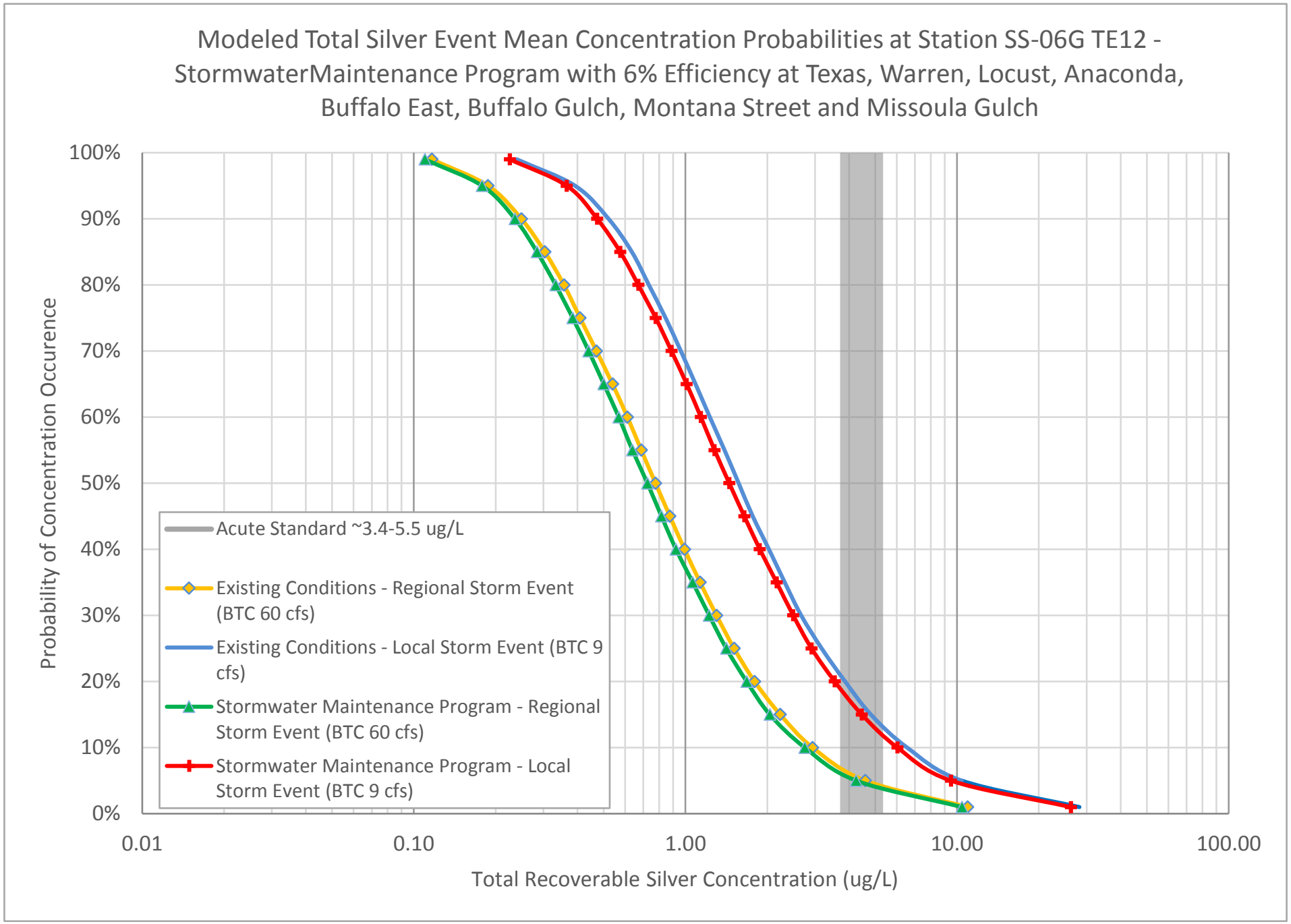


Figure E-130
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

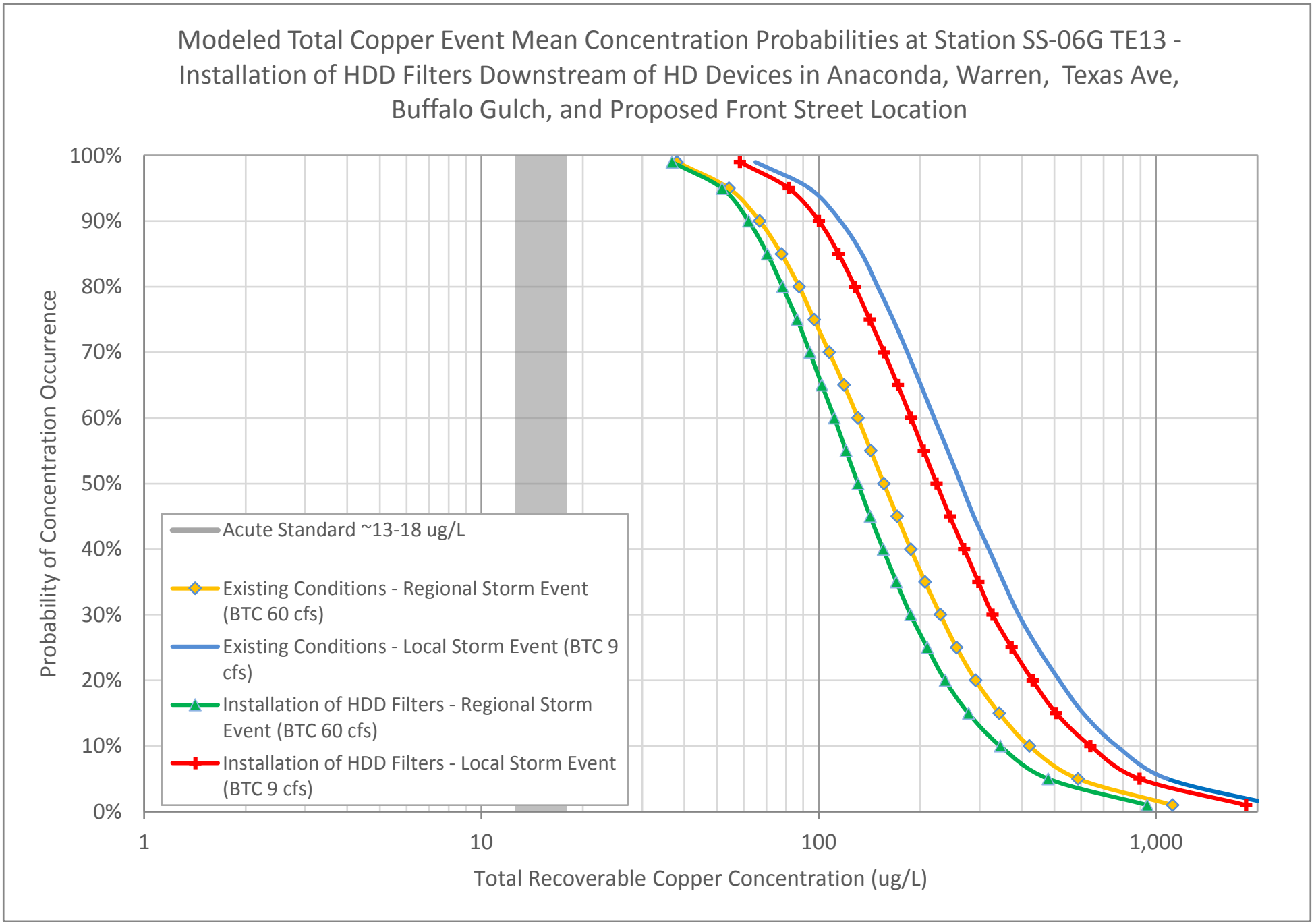


Figure E-131
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

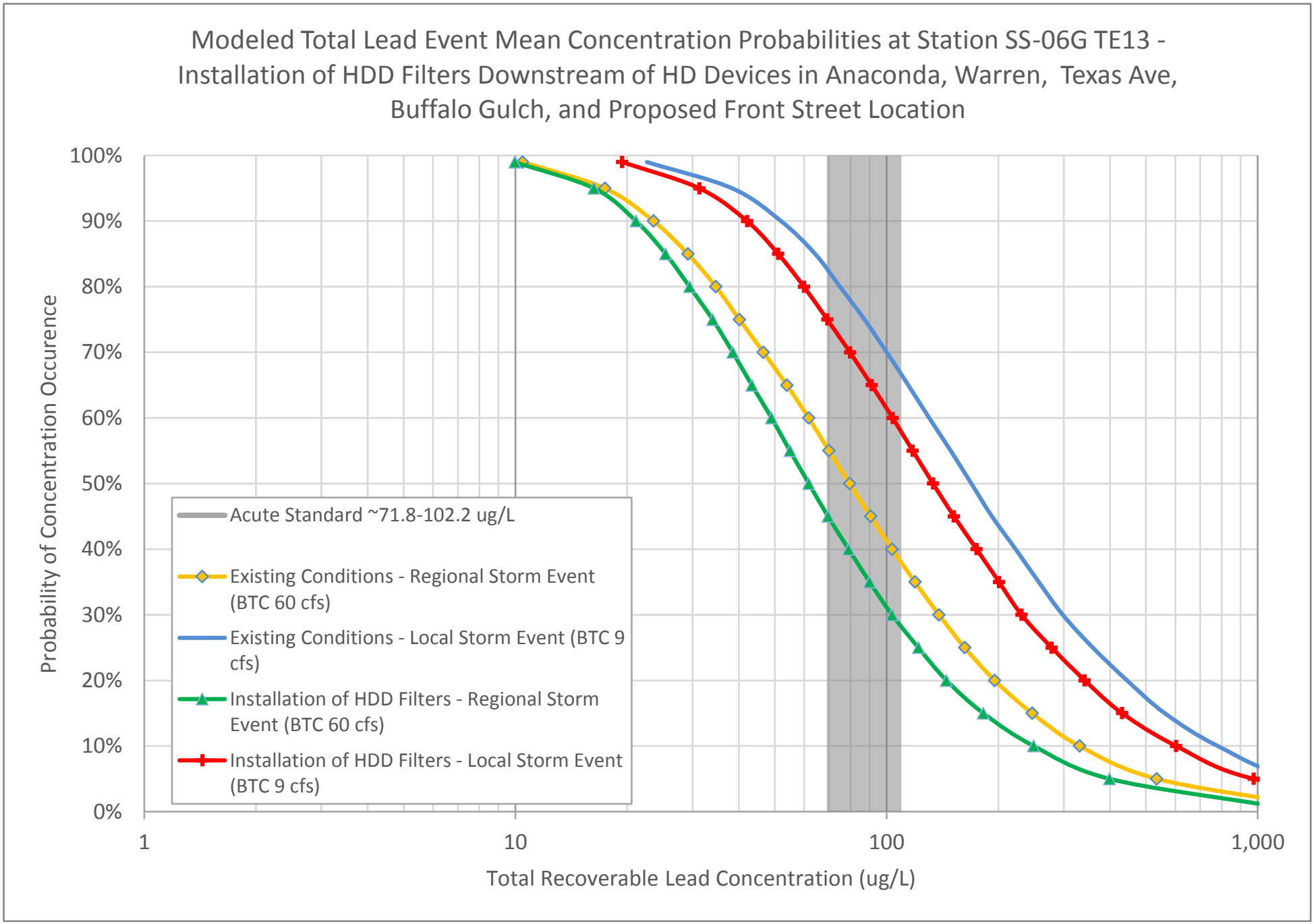


Figure E-132
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

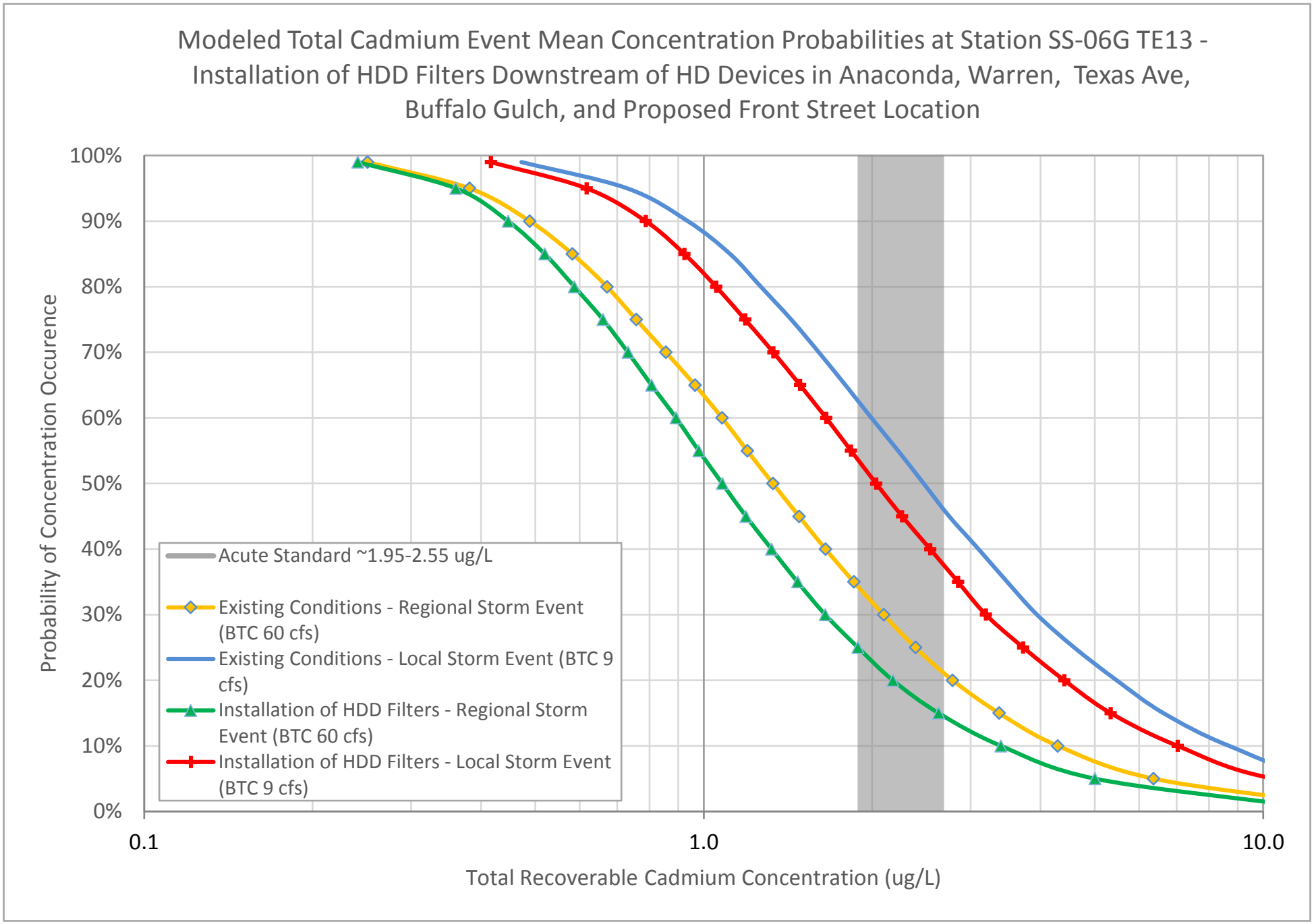


Figure E-133
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

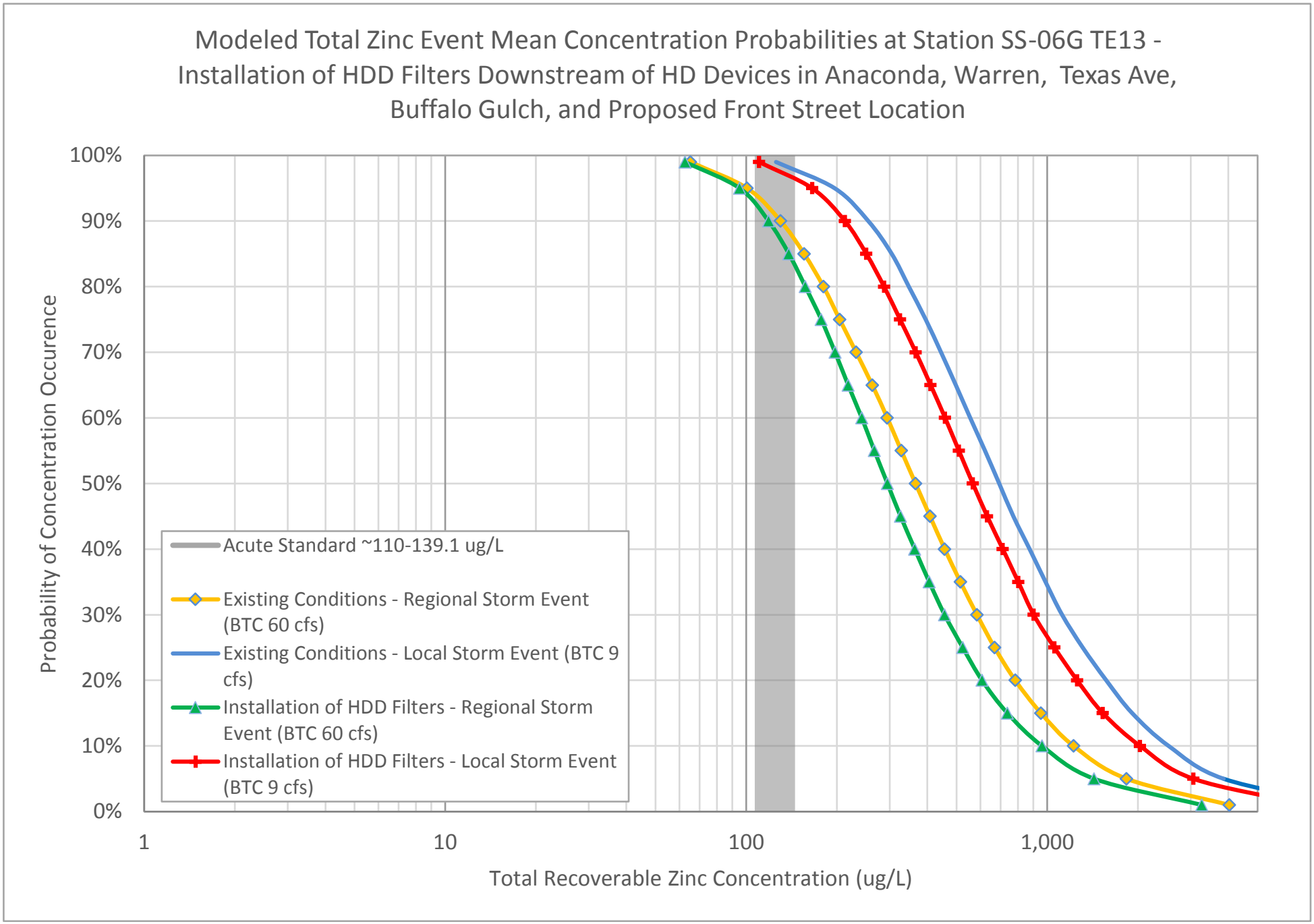


Figure E-134
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

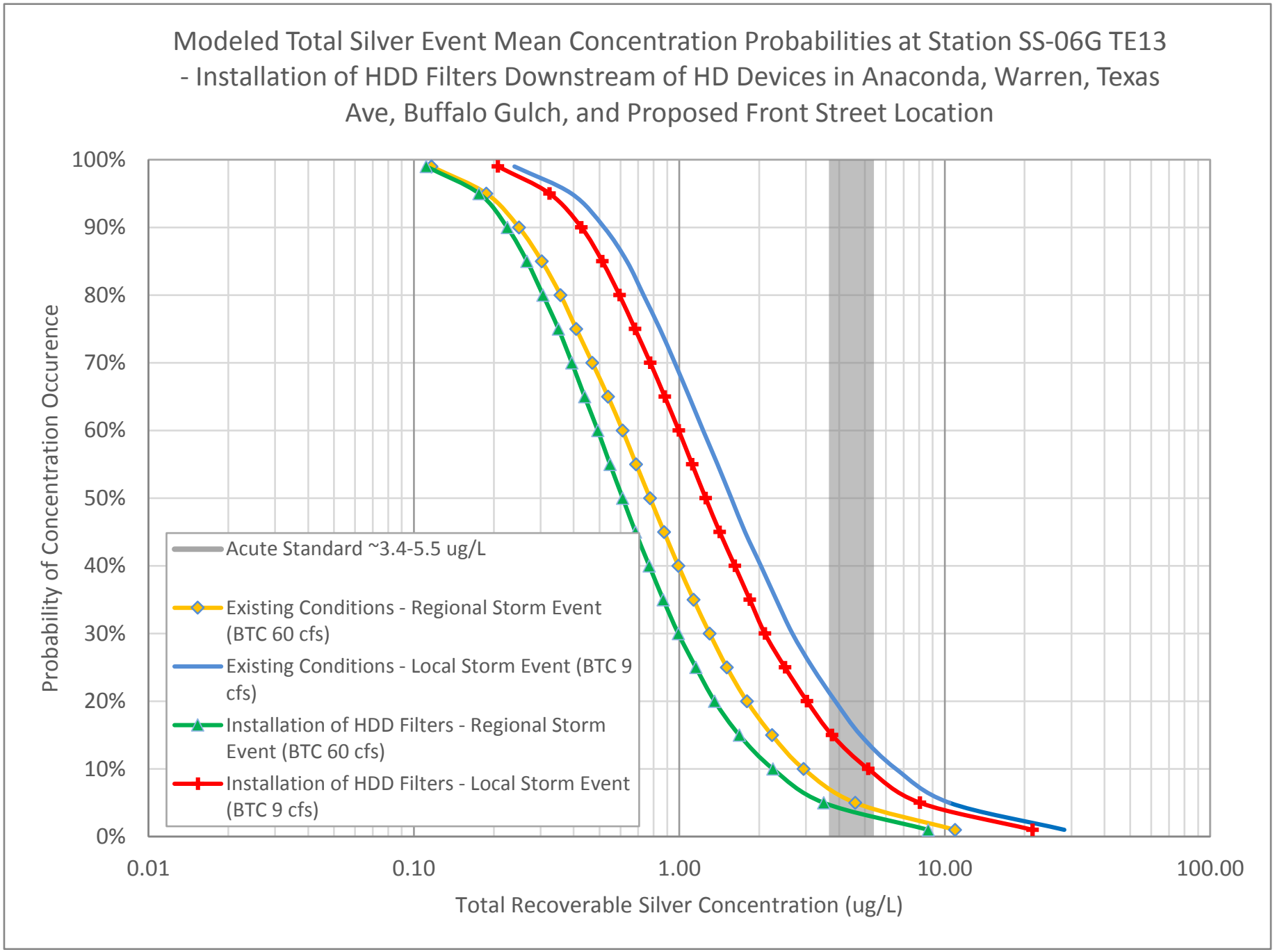


Figure E-135
Event Mean Concentration Results

Surface Water TI Report
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

APPENDIX F

Input Parameters to Stochastic Model for Technology Element Scenarios

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC
Warren Avenue	0%	NA	Turned off – modeled in upper SBC
Anaconda Road	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC
Driggs Street	0%	NA	Turned off – modeled in upper SBC
Philips Avenue	0%	NA	Turned off – modeled in upper SBC
California Avenue	0%	NA	Turned off – modeled in upper SBC
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC
Buffalo East	0%	NA	Turned off – modeled in upper SBC
Upper SBC-3A	100%	0%	No change
Buffalo Gulch	10%	0%	Outfall diverted to the Berkeley Pit through the Belmont Diversion
Montana Street	100%	0%	No change
Missoula Gulch	100%	0%	No change

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Figure F-1

TE2 Stochastic Model Flow and Chemistry Settings

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC
Warren Avenue	0%	NA	Turned off – modeled in upper SBC
Anaconda Road	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC
Driggs Street	0%	NA	Turned off – modeled in upper SBC
Philips Avenue	0%	NA	Turned off – modeled in upper SBC
California Avenue	0%	NA	Turned off – modeled in upper SBC
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC
Buffalo East	0%	NA	Turned off – modeled in upper SBC
Upper SBC - 3A	100%	5% / 70%	Upper SBC diverted to South George Detention / Retention Basin
Buffalo Gulch	100%	5% / 70%	Buffalo Gulch Diverted to Detention / Retention Basin near BG-01 outfall
Montana Street	100%	0%	No change
Missoula Gulch	100%	0%	No change

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC - 3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC
Warren Avenue	0%	NA	Turned off – modeled in upper SBC
Anaconda Road	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC
Driggs Street	0%	NA	Turned off – modeled in upper SBC
Philips Avenue	0%	NA	Turned off – modeled in upper SBC
California Avenue	0%	NA	Turned off – modeled in upper SBC
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC
Buffalo East	0%	NA	Turned off – modeled in upper SBC
Upper SBC-3A	100%	0%	No change
Buffalo Gulch	100%	7%	Hydrodynamic Device installed at Kaw Street and Front Street
Montana Street	100%	0%	No change
Missoula Gulch	100%	0%	No change

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC
Warren Avenue	0%	NA	Turned off – modeled in upper SBC
Anaconda Road	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC
Driggs Street	0%	NA	Turned off – modeled in upper SBC
Philips Avenue	0%	NA	Turned off – modeled in upper SBC
California Avenue	0%	NA	Turned off – modeled in upper SBC
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC
Buffalo East	0%	NA	Turned off – modeled in upper SBC
Upper SBC-3A	100%	3%	
Buffalo Gulch	100%	3%	
Montana Street	100%	3%	
Missoula Gulch	100%	3%	

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Figure F-4

TE7 Stochastic Model Flow and Chemistry Settings

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	100%	3%	
Upper SBC - Locust	100%	3%	
Warren Avenue	100%	3%	
Anaconda Road	100%	0%	No change
Harrison Avenue 1	100%	0%	No change
Harrison Avenue 2	100%	0%	No change
Driggs Street	100%	0%	No change
Philips Avenue	100%	0%	No change
California Avenue	100%	0%	No change
Delaware Avenue	100%	0%	No change
Buffalo East	100%	0%	No change
Upper SBC-3A	0%	NA	Turned off – modeled using data from outfalls upstream of upper SBC-3A
Buffalo Gulch	100%	0%	No change
Montana Street	100%	0%	No change
Missoula Gulch	100%	3%	

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC
Warren Avenue	0%	NA	Turned off – modeled in upper SBC
Anaconda Road	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC
Driggs Street	0%	NA	Turned off – modeled in upper SBC
Philips Avenue	0%	NA	Turned off – modeled in upper SBC
California Avenue	0%	NA	Turned off – modeled in upper SBC
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC
Buffalo East	0%	NA	Turned off – modeled in upper SBC
Upper SBC – 3A	100%	10% / 90%	Upper SBC diverted to south George bioretention basin
Buffalo Gulch	100%	10% / 90%	Buffalo Gulch diverted to bioretention basin near BG-01 outfall
Montana Street	100%	0%	No change
Missoula Gulch	100%	0%	No change

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC -3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC-3A
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC-3A
Warren Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Anaconda Road	0%	NA	Turned off – modeled in upper SBC-3A
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC-3A
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC-3A
Driggs Street	0%	NA	Turned off – modeled in upper SBC-3A
Philips Avenue	0%	NA	Turned off – modeled in upper SBC-3A
California Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Buffalo East	0%	NA	Turned off – modeled in upper SBC-3A
Upper SBC - 3A	0% for 0 to 10.8 hours 100% from 10.8 hours	0%	
Buffalo Gulch	0% for 0 to 9.7 hours 100% from 10.7 hours	0%	First flush retention basin
Montana Street	100%	0%	No change
Missoula Gulch	100%	0%	No change

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC-3A
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC-3A
Warren Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Anaconda Road	0%	NA	Turned off – modeled in upper SBC-3A
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC-3A
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC-3A
Driggs Street	0%	NA	Turned off – modeled in upper SBC-3A
Philips Avenue	0%	NA	Turned off – modeled in upper SBC-3A
California Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Buffalo East	0%	NA	Turned off – modeled in upper SBC-3A
Upper SBC - 3A	50% / 0%	0%	Diverted to the Berkeley Pit
Buffalo Gulch	0%	0%	
Montana Street	0%	0%	
Missoula Gulch	0%	0%	

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	NA	Turned off – modeled in upper SBC-3A
Upper SBC - Locust	0%	NA	Turned off – modeled in upper SBC-3A
Warren Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Anaconda Road	0%	NA	Turned off – modeled in upper SBC-3A
Harrison Avenue 1	0%	NA	Turned off – modeled in upper SBC-3A
Harrison Avenue 2	0%	NA	Turned off – modeled in upper SBC-3A
Driggs Street	0%	NA	Turned off – modeled in upper SBC-3A
Philips Avenue	0%	NA	Turned off – modeled in upper SBC-3A
California Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Delaware Avenue	0%	NA	Turned off – modeled in upper SBC-3A
Buffalo East	0%	NA	Turned off – modeled in upper SBC-3A
Upper SBC-3A	100%	1% / 6%	
Buffalo Gulch	100%	1% / 6%	
Montana Street	100%	1% / 6%	
Missoula Gulch	100%	1% / 6%	

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

Model Input	Percent of Current Flow	Percent Reduction	Individual Drainage Setting Rationale
	Q	C-TR	
Upper SBC - Texas	0%	14%	
Upper SBC - Locust	0%	0%	No change
Warren Avenue	0%	26%	
Anaconda Road	0%	23%	
Harrison Avenue 1	0%	0%	No change
Harrison Avenue 2	0%	0%	No change
Driggs Street	0%	0%	No change
Philips Avenue	0%	0%	No change
California Avenue	0%	0%	No change
Delaware Avenue	0%	0%	No chance
Buffalo East	0%	0%	No change
Upper SBC-3A	0%	NA	Turned off – modeled through outfalls upstream of upper SBC-3A
Buffalo Gulch	0%	20%	
Montana Street	0%	0%	No chance
Missoula Gulch	0%	0%	No change

Notes:

Q = Flow, C-TR = Total Concentration, NA = Not Applicable

Model can either add up the sub-drainages contributing to upper SBC individually or consider the entire upper SBC at once using upper SBC-3A

TE 14 Option A

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
4	Installation of Detention/Retention Basin in BG	70%	25.4%	59.2%
4	Installation of Detention/Retention Basin in upper SBC-3A	70%	25.4%	59.2%
		Total Combined Effective Efficiency at BG =		**74.6%**
		Total Combined Effective Efficiency at upper SBC-3A =		**74.6%**

TE 14 Option B

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
9	Bioretention in BG	90%	8.5%	76.1%
9	Bioretention in upper SBC-3A	90%	8,5%	76.1%
		Total Combined Effective Efficiency at BG =		**91.5%**
		Total Combined Effective Efficiency at upper SBC =		**91.5%**

Figure F-11
TE14 High Efficiency Combinations –Stochastic Model Flow and Chemistry Settings

TE 14 Option C

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG at via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
6	Installing Hydrodynamic Devices▪	4.6%	80.7%	3.9%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	3.0%	82.1%	2.5%
8	Replacement of Buried Stormwater Trunk Lines – upper SBC Watershed ▪▪	1.6%	83.2%	1.4%
4	Installation of Detention/Retention Basin in BG	70%	24.2%	56.5%
4	Installation of Detention/Retention Basin in upper SBC-3A	70%	25.4%	59.2%
			Total Combined Effective Efficiency at BG =	**75.8%**
			Total Combined Effective Efficiency at upper SBC-3A =	**75.0%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

TE 14 Option D

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG at via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
6	Installing Hydrodynamic Devices ▪	4.6%	80.7%	3.9%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	3.0%	82.1%	2.5%
8	Replacement of Buried Stormwater Trunk Lines – upper SBC Watershed ▪▪	1.6%	83.2%	1.4%
9	Bioretention in BG	90%	8.1%	72.6%
9	Bioretention in upper SBC-3A	90%	8.5%	76.1%
			Total Combined Effective Efficiency at BG =	**91.9%**
			Total Combined Effective Efficiency at upper SBC-3A =	**91.7%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

Figure F-11
TE14 High Efficiency Combinations –Stochastic Model Flow and Chemistry Settings

▪ The HDD efficiency is 47% for water that passes through it. Per HydroCAD model, 9.8% of total watershed runoff volume flows through HDD is full of sediment and efficiency is 0. 9.8% of water treated to 47% efficiency equates to 4.6% watershed wide efficiency. This is an assumption, but necessary to allow for efficiency value to be applied at "end of pipe" where the model is based.

▪▪ The efficiency for TE8 – Sliplining of Texas, Warren and Locust Street, is calculated using a flow weighted average for the entire upper SBC watershed. This is to allow the upper SBC discharge point to be the input to the model, which is more accurate.

Notes:

1. The assumption that is made for the purpose of these calculations are conservative from the top of the watershed to the outlet and distributed uniformly over the watershed

2. The diversion of Buffalo Gulch at Porphyry Street (via Belmont Diversion) and the upper SBC to the Berkeley Pit are reflected in the model by the modification of the hydrographs, and therefore do not have an efficiency percentage associated with them. The volume of water associated with each diversion has been removed from the hydrographs in the model.

3. See the "Flowcharts" for a generalized representation of how the TEs interact and flow from upstream to downstream.

TE 14 Option A

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance Program	1%	96.0%	1.0%
			Combined Effective Efficiency at all outlets =	**4.0%**
4	Installation of Detention/Retention Basin in BG	5%	91.2%	4.8%
4	Installation of Detention/Retention Basin in upper SBC-3A	5%	91.2%	4.8%
			Total Combined Effective Efficiency at BG =	**8.8%**
			Total Combined Effective Efficiency at upper SBC-3A =	**8.8%**

TE 14 Option B

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance Program	1%	96.0%	1.0%
			Combined Effective Efficiency at all outlets =	**4.0%**
9	Bioretention in BG	10%	86.4%	9.6%
9	Bioretention in upper SBC-3A	10%	86.4%	9.6%
			Total Combined Effective Efficiency at BG =	**13.6%**
			Total Combined Effective Efficiency at upper SBC-3A =	**13.6%**

TE 14 Option C

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG at via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance Program	1%	96.0%	1.0%
			Combined Effective Efficiency at all outlets =	**4.0%**
6	Installing Hydrodynamic Devices▪	0.0%	96.0%	0.0%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	2.0%	94.1%	1.9%
8	Replacement of Buried Stormwater Trunk Lines – upper SBC Watershed ▪▪	1.1%	95.0%	1.1%
4	Installation of Detention/Retention Basin in BG	5%	91.2%	4.8%
4	Installation of Detention/Retention Basin in upper SBC-3A	5%	91.4%	4.8%
			Total Combined Effective Efficiency at BG =	**8.8%**
			Total Combined Effective Efficiency at upper SBC-3A =	**9.8%**
			Total Combined Effective Efficiency at Missoula Gulch =	**5.9%**

TE 14 Option D

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG at via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	90.0%	10.0%
12	Stormwater Maintenance Program	1%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
6	Installing Hydrodynamic Devices ▪	0.0%	96.0%	0.0%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	2.0%	94.1%	1.9%
8	Replacement of Buried Stormwater Trunk Lines – upper SBC Watershed ▪▪	1.1%	95.0%	1.1%
9	Bioretention in BG	10%	86.4%	9.6%
9	Bioretention in upper SBC-3A	10%	86.4%	9.6%
			Total Combined Effective Efficiency at BG =	**13.6%**
			Total Combined Effective Efficiency at upper SBC-3A =	**14.6%**
			Total Combined Effective Efficiency at Missoula Gulch =	**5.9%**

Figure F-12
TE14 Low Efficiency Combinations - Stochastic Model Flow and Chemistry Settings

▪ The HDD efficiency is 47% for water that passes through it. Per HydroCAD model, 9.8% of total watershed runoff volume flows through HDD is full of sediment and efficiency is 0. 9.8% of water treated to 47% efficiency equates to 4.6% watershed wide efficiency. This is an assumption, but necessary to allow for efficiency value to be applied at "end of pipe" where the model is based.

▪▪ The efficiency for TE8 – Sliplining of Texas, Warren and Locust Street, is calculated using a flow weighted average for the entire upper SBC watershed. This is to allow the upper SBC discharge point to be the input to the model, which is more accurate.

Notes:

1. The assumption that is made for the purpose of these calculations are conservative from the top of the watershed to the outlet and distributed uniformly over the watershed.

2. The diversion of Buffalo Gulch at Porphyry (via Belmont Diversion) and the upper SBC to the Berkeley Pit are reflected in the model by a modification of the hydrographs, and therefore do not have an efficiency percentage associated with them. The volume of water associated with each diversion has been removed from the hydrographs in the model.

3. See the "Flowcharts" for a generalized representation of how the TEs interact and flow from upstream to downstream.

TE 15 Option A

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
11	Diversions of upper SBC-3A to Berkeley Pit	Flow diversion (100%)	NA	NA
4	Installation of Detention/Retention Basin in BG	70%	25.4%	59.2%
			Total Combined Effective Efficiency at BG =	**74.6%**

TE 15 Option B

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
11	Diversions of upper SBC-3A to Berkeley Pit	Flow Diversion (100%)	NA	NA
9	Bioretention in BG	90%	8.5%	76.1%
			Total Combined Effective Efficiency at BG =	**91.5%**

TE 15 Option C

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
6	Installing Hydrodynamic Devices▪	4.6%	80.7%	3.9%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	3.0%	82.1%	2.5%
11	Diversions of upper SBC-3A to Berkeley Pit	Flow Diversion (100%)	NA	NA
4	Installation of Detention/Retention Basin in BG	70%	25.4%	59.2%
			Total Combined Effective Efficiency at BG =	**74.6%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

TE 15 Option D

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG at via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	10%	90.0%	10.0%
12	Stormwater Maintenance Program	6%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
6	Installing Hydrodynamic Devices ▪	4.6%	80.7%	3.9%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	3.0%	82.1%	2.5%
11	Diversions of upper SBC-3A to Berkeley Pit	Flow Diversion (100%)	NA	NA
9	Bioretention in BG	90%	8.5%	72.2%
			Total Combined Effective Efficiency at BG =	**91.5%**
			Total Combined Effective Efficiency at Missoula Gulch =	**17.9%**

Figure F-13
TE15 High Efficiency Combinations – Stochastic Model Flow and Chemistry Settings

▪ The HDD efficiency is 47% for water that passes through it. Per HydroCAD model, 9.8% of total watershed runoff volume flows through HDD is full of sediment and efficiency is 0. 9.8% of water treated to 47% efficiency equates to 4.6% watershed wide efficiency. This is an assumption, but necessary to allow for efficiency value to be applied at "end of pipe" where the model is based.

▪▪ Efficiency for TE8 – the replacement of buried stormwater trunk lines along Texas, Warren and Locust Street, is calculated using a flow weighted average for the entire upper SBC watershed. This is to allow the upper SBC discharge point to be the input to the model, which is more accurate.

Notes:

1. The assumption that is made for the purpose of these calculations are conservative from the top of the watershed to the outlet and distributed uniformly over the watershed

2. The diversion of Buffalo Gulch at Porphyry Street (via Belmont Diversion) and the upper SBC to the Berkeley Pit are reflected in the model by a modification of the hydrographs, and therefore do not have an efficiency percentage associated with them. The volume of water associated with each diversion has been removed from the hydrographs in the model.

3. See the "Flowcharts" for a generalized representation of how the TEs interact and flow from upstream to downstream

TE 15 Option A

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance Program	1%	96.0%	1.0%
			Combined Effective Efficiency at all outlets =	**4.0%**
11	Diversions of upper SBC-3A to Berkeley Pit	Flow diversion (100%)	NA	NA
4	Installation of Detention/Retention Basin in BG	5%	91.2%	4.8%
			Total Combined Effective Efficiency at BG =	**8.8%**

TE 15 Option B

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance Program	1%	96.0%	1.0%
			Combined Effective Efficiency at all outlets =	**4.0%**
11	Diversions of upper SBC-3A to Berkeley Pit	Flow Diversion (100%)	NA	NA
9	Bioretention in BG	10%	86.4%	9.6%
			Total Combined Effective Efficiency at BG =	**13.6%**

TE 15 Option C

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	97.0%	3.0%
12	Stormwater Maintenance Program	1%	96.0%	1.0%
			Combined Effective Efficiency at all outlets =	**4.0%**
6	Installing Hydrodynamic Devices▪	0.0%	96.0%	0.0%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	2.0%	94.1%	1.9%
8	Replacement of Buried Stormwater Trunk Lines – upper SBC Watershed ▪▪	1.1%	95.0%	1.1%
11	Diversions of upper SBC-3A to Berkeley Pit			
4	Installation of Detention/Retention Basin in BG	5%	91.2%	4.8%
			Total Combined Effective Efficiency at BG =	**8.8%**
			Total Combined Effective Efficiency at Missoula Gulch =	**5.9%**

TE 15 Option D

TE	Description	TE Efficiency %	% Load After TE	Effective Incremental Efficiency
2	Diversion of BG at via the Belmont Diversion	Flow diversion (100%)	NA	NA
7	Additional Source Controls	3%	90.0%	10.0%
12	Stormwater Maintenance Program	1%	84.6%	5.4%
			Combined Effective Efficiency at all outlets =	**15.4%**
6	Installing Hydrodynamic Devices ▪	0.0%	96.0%	0.0%
8	Replacement of Buried Stormwater Trunk Lines – Missoula Gulch	2.0%	94.1%	1.9%
8	Replacement of Buried Stormwater Trunk Lines – upper SBC Watershed ▪▪	1.1%	95.0%	1.1%
11	Diversions of upper SBC-3A to Berkeley Pit			
9	Bioretention in BG	10%	86.4%	9.6%
			Total Combined Effective Efficiency at BG =	**13.6%**
			Total Combined Effective Efficiency at Missoula Gulch =	**5.9%**

▪ The HDD efficiency is 47% for water that passes through it. Per HydroCAD model, 9.8% of total watershed runoff volume flows through HDD is full of sediment and efficiency is 0. 9.8% of water treated to 47% efficiency equates to 4.6% watershed wide efficiency. This is an assumption, but necessary to allow for efficiency value to be applied at "end of pipe" where the model is based.

▪▪ Efficiency for TE8 – the replacement of buried stormwater trunk lines along Texas, Warren and Locust Street, is calculated using a flow weighted average for the entire upper SBC watershed. This is to allow the upper SBC discharge point to be the input to the model, which is more accurate.

Notes:

1. The assumption that is made for the purpose of these calculations are conservative from the top of the watershed to the outlet and distributed uniformly over the watershed.

2. The diversion of Buffalo Gulch at Porphyry Street (via Belmont Diversion) and the upper SBC to the Berkeley Pit are reflected in the model by a modification of the hydrographs, and therefore do not have an efficiency percentage associated with them. The volume of water associated with each diversion has been removed from the hydrographs in the model.

3. See the "Flowcharts" for a generalized representation of how the TEs interact and flow from upstream to downstream.

Figure F-14
TE15 Low Efficiency Combinations – Stochastic Model Flow and Chemistry Settings

APPENDIX G

Cost Estimate Summary

TABLE A: Summary of Costs

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI

Location: Butte, Montana

Phase: Conceptual Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

ELEMENT DESCRIPTION	CAPITAL COSTS	ANNUAL O&M COSTS (YEARS 1 through 30) [1]	PERIODIC COSTS (YEAR 30)	PERIODIC COSTS (YEARS 5, 10, 15, 20, 25, and 30)	NET PRESENT VALUE (30 YEARS AT 7% DISCOUNT)
Silver Bow Creek Sediment Removal	$4,638,429	$1,712	$0	$0	$4,689,113
ELEMENT 9: Upper Silver Bow Creek Bioretention Basin	$6,729,221	$14,275	$1,702,103	$813,808	$9,500,000
ELEMENT 9: Buffalo Gulch Bioretention Basin	$5,233,144	$10,658	$1,457,413	$430,058	$7,010,000

Notes:

[1] Annual O&M Costs for SBC Sediment Removal, Years 1 and 2 = $18,118; Year 30 = $0.

Table G-1a Current Baseline Conditions

PRESENT VALUE ANALYSIS

Site: Butte Priority Soils Operable Unit TI
Location: Butte, Montana
Phase: Conceptual Construction Costs
Base Year: 2017

Discount Rate = 7%

Year	Capital Costs	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[1]	Discount Factor (7.0%)	Present Value[2]
0	$4,638,429	$0	$0	$4,638,429	1.0000	$4,638,429
1	$0	$18,118	$0	$18,118	0.9346	$16,933
2	$0	$18,118	$0	$18,118	0.8734	$15,824
3	$0	$1,712	$0	$1,712	0.8163	$1,398
4	$0	$1,712	$0	$1,712	0.7629	$1,306
5	$0	$1,712	$0	$1,712	0.7130	$1,221
6	$0	$1,712	$0	$1,712	0.6663	$1,141
7	$0	$1,712	$0	$1,712	0.6227	$1,066
8	$0	$1,712	$0	$1,712	0.5820	$997
9	$0	$1,712	$0	$1,712	0.5439	$931
10	$0	$1,712	$0	$1,712	0.5083	$870
11	$0	$1,712	$0	$1,712	0.4751	$814
12	$0	$1,712	$0	$1,712	0.4440	$760
13	$0	$1,712	$0	$1,712	0.4150	$711
14	$0	$1,712	$0	$1,712	0.3878	$664
15	$0	$1,712	$0	$1,712	0.3624	$621
16	$0	$1,712	$0	$1,712	0.3387	$580
17	$0	$1,712	$0	$1,712	0.3166	$542
18	$0	$1,712	$0	$1,712	0.2959	$507
19	$0	$1,712	$0	$1,712	0.2765	$473
20	$0	$1,712	$0	$1,712	0.2584	$442
21	$0	$1,712	$0	$1,712	0.2415	$414
22	$0	$1,712	$0	$1,712	0.2257	$386
23	$0	$1,712	$0	$1,712	0.2109	$361
24	$0	$1,712	$0	$1,712	0.1971	$337
25	$0	$1,712	$0	$1,712	0.1842	$315
26	$0	$1,712	$0	$1,712	0.1722	$295
27	$0	$1,712	$0	$1,712	0.1609	$276
28	$0	$1,712	$0	$1,712	0.1504	$258
29	$0	$1,712	$0	$1,712	0.1406	$241
30	$0	$0	$0	$0	0.1314	$0
TOTALS:	$4,638,429	$82,467	$0	$4,720,896		$4,689,113
TOTAL PRESENT VALUE						**$4,690,000**

Notes:
Duration is assumed to be 30 years for the Present Value Analysis
[1] Total annual expenditure is the total cost per year with no discounting.
[2] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRFT for details.
Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE G-1b. Silver Bow Creek Sediment Removal Current Baseline Conditions

SCREENING COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI Silver Bow Creek

Location: Butte, Montana

Phase: Conceptual Construction Costs

Base Year: 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
General Conditions	1	LS	$275,389	$275,389	Unit costs, quantities, and calculations in Cost Worksheets .
General Conditions					
Work Plans	1	LS	$20,000	$20,000	Unit costs, quantities, and calculations in Cost Worksheets .
Dust Suppression Water Truck	8	WK	$5,279	$42,228	Unit costs, quantities, and calculations in Cost Worksheets .
Survey Crew	119	HR	$120	$14,280	Unit costs, quantities, and calculations in Cost Worksheets .
Survey Report	1	LS	$5,038	$5,038	Unit costs, quantities, and calculations in Cost Worksheets .
Ambient Air Monitoring	3	MO	$10,810	$32,430	Unit costs, quantities, and calculations in Cost Worksheets .
Soil Samples and Analysis	1	LS	$10,000	$10,000	Unit costs, quantities, and calculations in Cost Worksheets .
Site Preparation					
Traffic Control	60	HR	$673	$40,370	Unit costs, quantities, and calculations in Cost Worksheets .
Traffic Signs	5	EA	$188	$940	Unit costs, quantities, and calculations in Cost Worksheets .
Erosion Control Installation and Maintenance	2,000	LF	$2.0	$3,940	Unit costs, quantities, and calculations in Cost Worksheets .
Erosion Control (straw wattle)	474	EA	$72	$34,361	Unit costs, quantities, and calculations in Cost Worksheets .
Safety Fence	10,840	LF	$1.4	$15,089	Unit costs, quantities, and calculations in Cost Worksheets .
Earthwork					
Excavation	39,800	BCY	$1.8	$72,038	Unit costs, quantities, and calculations in Cost Worksheets .
Loading For Hauling	47,760	LCY	$1.4	$65,431	Unit costs, quantities, and calculations in Cost Worksheets .
Hauling of Excavated Materials	47,760	LCY	$11	$501,480	Unit costs, quantities, and calculations in Cost Worksheets .
Riprap for for streambed and embankment reconstruction (material)	5,175	TON	$29	$152,274	Unit costs, quantities, and calculations in Cost Worksheets .
Riprap for for streambed and embankment reconstruction	3,450	LCY	$34	$116,903	Unit costs, quantities, and calculations in Cost Worksheets .
Crushed Stones 3/4 minus for for streambed and embankment reconstruction (material)	6,300	TON	$26	$160,875	Unit costs, quantities, and calculations in Cost Worksheets .
Crushed Stones 3/4 minus for for streambed and embankment reconstruction	6,750	LCY	$12	$80,993	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media for Embankment Reconstruction (material)	6,000	LCY	$44	$265,680	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media for Embankment Reconstruction	5,000	BCY	$3.4	$17,145	Unit costs, quantities, and calculations in Cost Worksheets .
Common backfill for streambed and embankment reconstruction (material)	37,320	LCY	$23	$869,090	Unit costs, quantities, and calculations in Cost Worksheets .
Common backfill for streambed and embankment reconstruction	31,100	BCY	$3.4	$106,642	Unit costs, quantities, and calculations in Cost Worksheets .
Geotextile	114,000	SF	$0.2	$20,520	Unit costs, quantities, and calculations in Cost Worksheets .
Temporary bypass structure for stream diversion	3	Month	$13,130	$39,390	Unit costs, quantities, and calculations in Cost Worksheets .
Temporary bypass structure installation and removal	16	Hrs	$244	$3,910	Unit costs, quantities, and calculations in Cost Worksheets .
Utility Relocation					
24" Storm Water Pipe	50	LF	$145	$7,250	Unit costs, quantities, and calculations in Cost Worksheets .
30" Storm Water Pipe	130	LF	$145	$18,850	Unit costs, quantities, and calculations in Cost Worksheets .
6" Storm Water Pipe	100	LF	$145	$14,500	Unit costs, quantities, and calculations in Cost Worksheets .
Restoration					
Final Topsoil Grading	3	ACR	$700	$2,240	Unit costs, quantities, and calculations in Cost Worksheets .
Prepare Seedbed	3	ACR	$950	$3,040	Unit costs, quantities, and calculations in Cost Worksheets .
Seeding and Fertilizing	3	ACR	$1,800	$5,760	Unit costs, quantities, and calculations in Cost Worksheets .
Hydromulching	3	ACR	$3,500	$11,200	Unit costs, quantities, and calculations in Cost Worksheets .
SUBTOTAL				**$3,029,277**	
Contingency (Scope and Bid)	20%			$605,855	10% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$3,635,132	

TABLE G-1b. Silver Bow Creek Sediment Removal Current Baseline Conditions

SCREENING COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI Silver Bow Creek

Location: Butte, Montana

Phase: Conceptual Construction Costs

Base Year: 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

Project Management	5%			$181,757	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design	12%			$436,216	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	6%			$218,108	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
SUBTOTAL				$836,081	
Contingency (Scope and Bid)	20%			$167,216	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
TOTAL				**$4,638,429**	
O&M Costs (years 1 and 2)					
Weed Control	20	Hrs	$65.85	$1,317	
Erosion Control Maintenance Maintenance	10	Hrs	$65.85	$658	
Seeding and Fertilizing	2	Yr	$1,800.00	$2,880	
Hydromulching	2	Yr	$3,500.00	$5,600	
SUBTOTAL				$10,455	
Contingency (Scope and Bid)	20%			$2,091	10% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$12,546	
Project Management	10%			$1,255	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design	12%			$1,506	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	15%			$1,882	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
SUBTOTAL				$4,643	
Contingency (Scope and Bid)	20%			$929	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
TOTAL				**$18,118**	
O&M Costs (years 3 through 30)					
Weed Control	10	Hrs	$65.85	$658	
Erosion Control Maintenance Maintenance	5	Hrs	$65.85	$329	
SUBTOTAL				$988	
Contingency (Scope and Bid)	20%			$198	10% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$1,185	
Project Management	10%			$119	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design	12%			$142	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	15%			$178	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
SUBTOTAL				$439	
Contingency (Scope and Bid)	20%			$88	10% Scope, 10% Bid (Low end of the recommended range in EPA 540-R-00-002).
TOTAL				**$1,712**	

Notes:

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Costs presented for this estimate are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

TABLE G-1b. Silver Bow Creek Sediment Removal Current Baseline Conditions

SCREENING COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI Silver Bow Creek

Location: Butte, Montana

Phase: Conceptual Construction Costs

Base Year: 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

Abbreviations:

DAY	Days
EA	Each
HR	Hours
LF	Linear Feet
LS	Lump Sum
SF	Square Feet
QTY	Quantity

Cost presented are expected to have accuracy +50% to -30% of actual costs, based on the scope presented.

Table G-2a. Element 9 - Upper Silver Bow Creek Bioretantion Basin

PRESENT VALUE ANALYSIS

Site: Butte Priority Soils Operable Unit T
Location: Butte, Montana
Phase: Conceptual Costs
Base Year: 2017

Year	Capital Costs	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[1]	Discount Factor (7.0%)	Present Value[2]
0	$6,729,221	$0	$0	$6,729,221	1.0000	$6,729,221
1	$0	$14,275	$0	$14,275	0.9346	$13,341
2	$0	$14,275	$0	$14,275	0.8734	$12,467
3	$0	$14,275	$0	$14,275	0.8163	$11,652
4	$0	$14,275	$0	$14,275	0.7629	$10,890
5	$0	$14,275	$813,808	$828,082	0.7130	$590,423
6	$0	$14,275	$0	$14,275	0.6663	$9,511
7	$0	$14,275	$0	$14,275	0.6227	$8,889
8	$0	$14,275	$0	$14,275	0.5820	$8,308
9	$0	$14,275	$0	$14,275	0.5439	$7,764
10	$0	$14,275	$813,808	$828,082	0.5083	$420,914
11	$0	$14,275	$0	$14,275	0.4751	$6,782
12	$0	$14,275	$0	$14,275	0.4440	$6,338
13	$0	$14,275	$0	$14,275	0.4150	$5,924
14	$0	$14,275	$0	$14,275	0.3878	$5,536
15	$0	$14,275	$2,515,911	$2,530,186	0.3624	$916,939
16	$0	$14,275	$0	$14,275	0.3387	$4,835
17	$0	$14,275	$0	$14,275	0.3166	$4,519
18	$0	$14,275	$0	$14,275	0.2959	$4,224
19	$0	$14,275	$0	$14,275	0.2765	$3,947
20	$0	$14,275	$813,808	$828,082	0.2584	$213,976
21	$0	$14,275	$0	$14,275	0.2415	$3,447
22	$0	$14,275	$0	$14,275	0.2257	$3,222
23	$0	$14,275	$0	$14,275	0.2109	$3,010
24	$0	$14,275	$0	$14,275	0.1971	$2,814
25	$0	$14,275	$813,808	$828,082	0.1842	$152,533
26	$0	$14,275	$0	$14,275	0.1722	$2,458
27	$0	$14,275	$0	$14,275	0.1609	$2,297
28	$0	$14,275	$0	$14,275	0.1504	$2,147
29	$0	$14,275	$0	$14,275	0.1406	$2,007
30	$0	$14,275	$2,515,911	$2,530,186	0.1314	$332,466
TOTALS:	$6,729,221	$428,235	$8,287,053	$15,444,509		$9,502,801
TOTAL PRESENT VALUE						**$9,500,000**

Notes:
[1] Total annual expenditure is the total cost per year with no discounting.
[2] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRFT for details.
Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE G-2b. Element 9: Upper Silver Bow Creek Bioretention Basin

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI - Upper Silver Bow Creek

Location: Butte, Montana

Phase: Conceptual Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Property acquisition	1	LS	$243,300	$243,300	Unit costs, quantities, and calculations in Cost Worksheets .
General Conditions					
General Conditions	1	LS		$353,816	10% of Construction Costs
Work Plans	1	LS	$25,000	$25,000	Unit costs, quantities, and calculations in Cost Worksheets .
Geotechnical evaluation and pre-construction soil testing	1	LS	$14,625	$14,625	Unit costs, quantities, and calculations in Cost Worksheets .
Dust Suppression Water Truck	8	WK	$5,279	$42,228	Unit costs, quantities, and calculations in Cost Worksheets .
Survey Crew	202	HR	$120	$24,240	Unit costs, quantities, and calculations in Cost Worksheets .
Survey Report	1	LS	$7,556	$7,556	Unit costs, quantities, and calculations in Cost Worksheets .
Ambient Air Monitoring	2	MO	$10,810	$21,620	Unit costs, quantities, and calculations in Cost Worksheets .
Site Preparation					Unit costs, quantities, and calculations in Cost Worksheets .
Traffic Control	40	DAY	$673	$26,913	Unit costs, quantities, and calculations in Cost Worksheets .
Traffic Signs	5	EA	$188	$940	Unit costs, quantities, and calculations in Cost Worksheets .
Erosion Control Installation and Maintenance	3,330	LF	$2.0	$6,560	Unit costs, quantities, and calculations in Cost Worksheets .
Fencing	3,250	LF	$26	$84,500	Unit costs, quantities, and calculations in Cost Worksheets .
Gates	4	EA	$1,225	$4,900	Unit costs, quantities, and calculations in Cost Worksheets .
Utility Relocation					
Potable Water	1	LS	$120,000	$120,000	Unit costs, quantities, and calculations in Cost Worksheets .
Earthwork					
Pavement Removal And Replacement	1,100	SF	$5.0	$5,500	Unit costs, quantities, and calculations in Cost Worksheets .
Excavation	82,490	BCY	$1.8	$149,307	
Loading For Hauling	39,150	LCY	$1.4	$53,636	Unit costs, quantities, and calculations in Cost Worksheets .
Hauling of Excavated Materials	39,150	LCY	$10.5	$411,075	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media for Berm Construction (material)	1,164	LCY	$44.3	$51,542	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media for Berm Construction	970	BCY	$3.4	$3,326	Unit costs, quantities, and calculations in Cost Worksheets .
Gravel for Center Berm Road	1,960	TON	$27.1	$53,200	Unit costs, quantities, and calculations in Cost Worksheets .
Geomembrane	513,000	SF	$0.6	$307,800	Unit costs, quantities, and calculations in Cost Worksheets .
Geotextile	513,000	SF	$0.2	$92,340	Unit costs, quantities, and calculations in Cost Worksheets .
Concrete Forebay	3,320	SF	$8.8	$29,050	Unit costs, quantities, and calculations in Cost Worksheets .
Filter Media Discharge Piping	1	LS	$87,759.0	$87,759	Unit costs, quantities, and calculations in Cost Worksheets .
Inlet/Discharge Piping Spillway	1	LS	$85,100.0	$85,100	Unit costs, quantities, and calculations in Cost Worksheets .
Piping Installation (including trenching)	900	LF	$65.0	$58,500	Unit costs, quantities, and calculations in Cost Worksheets .
Precast Concrete Inlet/Diversion Structure	1	LS	$82,800.0	$82,800	Unit costs, quantities, and calculations in Cost Worksheets .
Pre-cast Concrete Spillway Structure	1	LS	$41,009.0	$41,009	Unit costs, quantities, and calculations in Cost Worksheets .
Subsurface Drain	15,300	LF	$12.0	$183,600	Unit costs, quantities, and calculations in Cost Worksheets .
Cleanout Risers	50	EA	$199.1	$9,956	Unit costs, quantities, and calculations in Cost Worksheets .
Filter Media					
Filter Media Placement	33,240	LCY	$1.3	$44,209	Unit costs, quantities, and calculations in Cost Worksheets .
Mulch Placement	6,930	LCY	$1.3	$9,217	Unit costs, quantities, and calculations in Cost Worksheets .
Sand	12,927	TON	$14	$175,182	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media	10,157	TON	$44	$449,686	Unit costs, quantities, and calculations in Cost Worksheets .
Compost	6,925	TON	$54	$375,820	Unit costs, quantities, and calculations in Cost Worksheets .
Mulch	1,617	TON	$47	$76,225	Unit costs, quantities, and calculations in Cost Worksheets .

TABLE G-2b. Element 9: Upper Silver Bow Creek Bioretention Basin

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI - Upper Silver Bow Creek

Location: Butte, Montana

Phase: Conceptual Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

Restoration					
Final Topsoil Grading	12	ACR	$700	$8,051	Unit costs, quantities, and calculations in Cost Worksheets .
Prepare Seedbed	12	ACR	$950	$10,926	Unit costs, quantities, and calculations in Cost Worksheets .
Seeding and Fertilizing	12	ACR	$1,800	$20,702	Unit costs, quantities, and calculations in Cost Worksheets .
Hydromulching	12	ACR	$3,500	$40,255	Unit costs, quantities, and calculations in Cost Worksheets .
SUBTOTAL				**$3,891,973**	
Contingency (Scope and Bid)	30%			$1,167,592	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$5,059,564	
Project Management	5%			$252,978	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design	12%			$607,148	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	6%			$303,574	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Technical Support	10%			$505,956.43	
TOTAL CONSTRUCTION COSTS				**$6,729,221**	
Annual O&M					
Annual Operation and Maintenance	40	HRS	$111	$4,452	
Annual Sediment Removal	8	HRS	$542	$4,332	
SUBTOTAL				$8,784	
Contingency (Scope and Bid)	30%			$2,635	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$11,420	
Project Management	10%			$1,142	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	15%			$1,713	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL ANNUAL O&M COSTS				**$14,275**	
Periodic Costs (year 2022, 2027, 2037, 2042)					
Removal and Loading of the Filter Media	11,620	BCY	$2.9	$34,023.36	
Hauling of the Filter Media	13,930	LCY	$10.5	$146,265.00	
Filter Media Placement	8,400	LCY	$1.3	$11,172.00	
Mulch Placement	6,930	LCY	$1.3	$9,216.90	
Sand Replacement	3,267	TON	$13.6	$44,269.87	
Compost Replacement	1,750	TON	$44.3	$77,481.25	
Topsoil Replacement	2,567	TON	$54.3	$139,275.03	
Mulch Replacement	1,617	TON	$47.1	$76,235.08	
Seeding and Fertilizing	16,701	SY	$0.7	$11,189.67	
SUBTOTAL				$549,128	
Contingency (Scope and Bid)	30%			$164,738	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$713,867	
Project Management	6%			$42,832	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	8%			$57,109	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL PERIODIC COSTS				**$813,808**	

TABLE G-2b. Element 9: Upper Silver Bow Creek Bioretention Basin

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI - Upper Silver Bow Creek

Location: Butte, Montana

Phase: Conceptual Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

Periodic Costs (year 2032and 2047)					
Removal and Loading of the Filter Media	32,320	BCY	$2.9	$94,633	
Hauling of the Filter Media	40,170	LCY	$10.5	$421,785	
Filter Media Placement	33,240	LCY	$1.3	$44,209	
Mulch Placement	6,930	LCY	$1.3	$9,217	
Sand Replacement	12,927	TON	$13.6	$175,182	
Compost Replacement	6,925	TON	$44.3	$306,604	
Topsoil Replacement	10,157	TON	$54.3	$551,131	
Mulch Replacement	1,617	TON	$47.1	$76,235	
Seeding and Fertilizing	27,835	SY	$0.7	$18,649	
SUBTOTAL				$1,697,646	
Contingency (Scope and Bid)	30%			$509,294	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$2,206,940	
Project Management	6%			$132,416	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	8%			$176,555	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL PERIODIC COSTS				**$2,515,911**	

Notes:

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Costs presented for this estimate are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

Abbreviations:

DAY Days
EA Each
HR Hours
LF Linear Feet
LS Lump Sum
SF Square Feet
QTY Quantity

Cost presented are expected to have accuracy +50% to -30% of actual costs, based on the scope presented.

Table G-3a: Element 9: Buffalo Gulch Bioretention Basin

PRESENT VALUE ANALYSIS

Site: Butte Priority Soils Operable Unit TI
Location: Butte, Montana
Phase: Conceptual Construction Costs
Base Year: 2017

Year	Capital Costs	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[1]	Discount Factor (7.0%)	Present Value[2]
0	$5,233,144	$0	$0	$5,233,144	1.0000	$5,233,144
1	$0	$10,658	$0	$10,658	0.9346	$9,961
2	$0	$10,658	$0	$10,658	0.8734	$9,308
3	$0	$10,658	$0	$10,658	0.8163	$8,700
4	$0	$10,658	$0	$10,658	0.7629	$8,131
5	$0	$10,658	$430,058	$440,715	0.7130	$314,230
6	$0	$10,658	$0	$10,658	0.6663	$7,101
7	$0	$10,658	$0	$10,658	0.6227	$6,637
8	$0	$10,658	$0	$10,658	0.5820	$6,203
9	$0	$10,658	$0	$10,658	0.5439	$5,797
10	$0	$10,658	$430,058	$440,715	0.5083	$224,016
11	$0	$10,658	$0	$10,658	0.4751	$5,063
12	$0	$10,658	$0	$10,658	0.4440	$4,732
13	$0	$10,658	$0	$10,658	0.4150	$4,423
14	$0	$10,658	$0	$10,658	0.3878	$4,133
15	$0	$10,658	$1,887,471	$1,898,129	0.3624	$687,882
16	$0	$10,658	$0	$10,658	0.3387	$3,610
17	$0	$10,658	$0	$10,658	0.3166	$3,374
18	$0	$10,658	$0	$10,658	0.2959	$3,154
19	$0	$10,658	$0	$10,658	0.2765	$2,947
20	$0	$10,658	$430,058	$440,715	0.2584	$113,881
21	$0	$10,658	$0	$10,658	0.2415	$2,574
22	$0	$10,658	$0	$10,658	0.2257	$2,405
23	$0	$10,658	$0	$10,658	0.2109	$2,248
24	$0	$10,658	$0	$10,658	0.1971	$2,101
25	$0	$10,658	$430,058	$440,715	0.1842	$81,180
26	$0	$10,658	$0	$10,658	0.1722	$1,835
27	$0	$10,658	$0	$10,658	0.1609	$1,715
28	$0	$10,658	$0	$10,658	0.1504	$1,603
29	$0	$10,658	$0	$10,658	0.1406	$1,498
30	$0	$10,658	$1,887,471	$1,898,129	0.1314	$249,414
TOTALS:	$5,233,144	$319,733	$5,495,172	$11,048,048		$7,013,000
TOTAL PRESENT VALUE						**$7,010,000**

Notes:
[1] Total annual expenditure is the total cost per year with no discounting.
[2] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRFT for details.
Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE G-3b. Element 9: Buffalo Gulch Bioretention Basin

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI - Buffalo Gulch

Location: Butte, Montana

Phase: Conceptual Construction Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Property acquisition	1	LS	$98,800	$98,800.00	Unit costs, quantities, and calculations in Cost Worksheets .
General Conditions					
General Conditions	1	LS	$275,153	$275,153	10% of Construction Costs
Work Plans	1	LS	$20,000	$20,000	Unit costs, quantities, and calculations in Cost Worksheets .
Geotechnical evaluation and pre-construction soil testing	1	LS	$11,250	$11,250.00	Unit costs, quantities, and calculations in Cost Worksheets .
Dust Suppression Water Truck	4	WK	$5,279	$21,114.24	Unit costs, quantities, and calculations in Cost Worksheets .
Survey Crew	122	HR	$120	$14,640.00	Unit costs, quantities, and calculations in Cost Worksheets .
Survey Report	1	LS	$6,539	$6,539.06	Unit costs, quantities, and calculations in Cost Worksheets .
Ambient Air Monitoring	1	MO	$10,810	$10,810.00	Unit costs, quantities, and calculations in Cost Worksheets .
Site Preparation					
Traffic Control	20	DAY	$673	$13,456.60	Unit costs, quantities, and calculations in Cost Worksheets .
Traffic Signs	5	EA	$188	$940.00	Unit costs, quantities, and calculations in Cost Worksheets .
Erosion Control Installation and Maintenance	3,630	LF	$2.0	$7,151.10	Unit costs, quantities, and calculations in Cost Worksheets .
Fencing	3,550	LF	$26	$92,300.00	Unit costs, quantities, and calculations in Cost Worksheets .
Gates	4	EA	$1,225	$4,900.00	Unit costs, quantities, and calculations in Cost Worksheets .
Utility Relocation					
Natural Gas Distribution Line	700	LF	$375	$262,500.00	Unit costs, quantities, and calculations in Cost Worksheets .
Electric Line	400	LF	$95	$38,000.00	Unit costs, quantities, and calculations in Cost Worksheets .
Storm Drain Pipe	850	LF	$110	$93,500.00	Unit costs, quantities, and calculations in Cost Worksheets .
Earthwork					
Pavement Removal And Replacement	11,500	SF	$5.0	$57,500.00	Unit costs, quantities, and calculations in Cost Worksheets .
Excavation	33,830	BCY	$1.8	$61,232.30	Unit costs, quantities, and calculations in Cost Worksheets .
Loading For Hauling	18,585	LCY	$1.4	$25,461.45	Unit costs, quantities, and calculations in Cost Worksheets .
Hauling of Excavated Materials	18,585	LCY	$11	$195,142.50	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media for Berm Construction (material)	1,416	LCY	$44	$62,700.48	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media for Berm Construction	1,180	BCY	$3.4	$4,046.22	Unit costs, quantities, and calculations in Cost Worksheets .
Fill Material for Berm Construction (material)	6,600	LCY	$17	$113,850.00	Unit costs, quantities, and calculations in Cost Worksheets .
Fill Material for Berm Construction	5,500	BCY	$3.4	$18,859.50	Unit costs, quantities, and calculations in Cost Worksheets .
Compaction of Backfill for Berm Construction	4,950	ECY	$3.6	$17,869.50	Unit costs, quantities, and calculations in Cost Worksheets .
Gravel for Center Berm Road	1,652	TON	$27	$44,840.00	Unit costs, quantities, and calculations in Cost Worksheets .
Geomembrane	291,200	SF	$0.6	$174,720.00	Unit costs, quantities, and calculations in Cost Worksheets .
Geotextile	291,200	SF	$0.2	$52,416.00	Unit costs, quantities, and calculations in Cost Worksheets .
Concrete Forebay	3,320	SF	$8.8	$29,050.00	Unit costs, quantities, and calculations in Cost Worksheets .
Filter Media Discharge Piping	1	LS	$26,163	$26,163.00	Unit costs, quantities, and calculations in Cost Worksheets .
Stormwater Piping	1	LS	$111,450	$111,450.00	Unit costs, quantities, and calculations in Cost Worksheets .
Inlet/Discharge Piping Spillway	1	LS	$14,390	$14,390.00	Unit costs, quantities, and calculations in Cost Worksheets .
Piping Installation (including trenching)	100	LF	$65	$6,500.00	Unit costs, quantities, and calculations in Cost Worksheets .
Pre-cast Concrete Spillway Structure	1	LS	$43,660	$43,660.00	Unit costs, quantities, and calculations in Cost Worksheets .
Subsurface Drain	7,884	LF	$12	$94,608.00	Unit costs, quantities, and calculations in Cost Worksheets .
Cleanout Risers	36	EA	$199	$7,168.39	Unit costs, quantities, and calculations in Cost Worksheets .
Filter Media					
Filter Media Placement	25,560	LCY	$1.3	$33,994.80	Unit costs, quantities, and calculations in Cost Worksheets .
Mulch Placement	3,540	LCY	$1.3	$4,708.20	Unit costs, quantities, and calculations in Cost Worksheets .
Sand	9,940	TON	$14	$134,722.50	Unit costs, quantities, and calculations in Cost Worksheets .
Growth Media	7,810	TON	$44	$345,826.80	Unit costs, quantities, and calculations in Cost Worksheets .
Compost	5,325	TON	$54	$288,970.00	Unit costs, quantities, and calculations in Cost Worksheets .
Mulch	826	TON	$47	$38,940.00	Unit costs, quantities, and calculations in Cost Worksheets .

TABLE G-3b. Element 9: Buffalo Gulch Bioretention Basin

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI - Buffalo Gulch

Location: Butte, Montana

Phase: Conceptual Construction Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

Restoration					
Final Topsoil Grading	7	ACR	$700	$4,718.09	Unit costs, quantities, and calculations in Cost Worksheets .
Prepare Seedbed	7	ACR	$950	$6,403.12	Unit costs, quantities, and calculations in Cost Worksheets .
Seeding and Fertilizing	7	ACR	$1,800	$12,132.23	Unit costs, quantities, and calculations in Cost Worksheets .
Hydromulching	7	ACR	$3,500	$23,590.45	Unit costs, quantities, and calculations in Cost Worksheets .
SUBTOTAL				$3,026,688	
Contingency (Scope and Bid)	30%			$908,006	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$3,934,694	
Project Management	5%			$196,735	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Remedial Design	12%			$472,163	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	6%			$236,082	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Technical Support	10%			$393,469	
CONSTRUCTION COSTS TOTAL				**$5,233,144**	
TOTAL ANNUAL O&M COSTS					
Annual Operation and Maintenance	20	DAY	$111	$2,226.00	
Annual Sediment Removal	8	HRS	$542	$4,332.27	
SUBTOTAL				$6,558	
Contingency (Scope and Bid)	30%			$1,967	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$8,526	
Project Management	10%			$853	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	15%			$1,279	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL ANNUAL O&M COSTS				**$10,658**	
Periodic Costs (year 2022, 2027, 2037, 2042)					
Removal and Loading of the Filter Media	5,960	BCY	$2.9	$17,451	
Hauling of the Filter Media for Disposal	7,860	LCY	$10.5	$82,530	
Filter Media Placement	4,320	LCY	$1.3	$5,746	
Mulch Placement	3,540	LCY	$1.3	$4,708	
Sand Replacement	1,680	TON	$13.6	$22,770	
Compost Replacement	900	TON	$44.3	$39,852	
Topsoil Replacement	1,320	TON	$54.3	$71,632	
Mulch Replacement	826	TON	$47.1	$38,940	
Seeding and Fertilizing	9,789	SY	$0.7	$6,559	
SUBTOTAL				$290,187	
Contingency (Scope and Bid)	30%			$87,056	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$377,244	
Project Management	6%			$22,635	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	8%			$30,179	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL PERIODIC COSTS				**$430,058**	
Periodic Costs (year 2032and 2047)					
Removal and Loading of the Filter Media	29,100	LCY	$2.9	$85,205	
Hauling of the Filter Media for Disposal	29,100	LCY	$10.5	$305,550	

TABLE G-3b. Element 9: Buffalo Gulch Bioretention Basin

COST ESTIMATE SUMMARY

Site: Butte Priority Soils Operable Unit TI - Buffalo Gulch

Location: Butte, Montana

Phase: Conceptual Construction Costs

Base Year: 2017

Date: February 27, 2017

This estimate was prepared to evaluate remedy option costs for contaminated storm water at the Butte Priority Soils Operable Unit (NPL) site. The primary purpose of these estimates is to demonstrate capital, O&M, periodic, and present value cost impacts from major remedy components related to these alternate remedial strategies. This estimate is considered to be Class 4 (Study or feasibility) according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). The rationale behind this classification is that the level of project definition falls between 1 percent and 15 percent. While the preliminary estimate is developed to be as accurate as the current information allows, the level of accuracy expected (including contingency) may be between +50 percent and -30 percent of the final estimate of probable construction cost and is generally consistent with the range indicated in Section 4.7.5 of EPA's Remedial Design/Remedial Action Handbook.

Filter Media Placement	25,560	LCY	$1.3	$33,995	
Mulch Placement	3,540	LCY	$1.3	$4,708	
Sand Replacement	9,940	TON	$13.6	$134,707	
Compost Replacement	5,325	TON	$44.3	$235,764	
Topsoil Replacement	7,810	TON	$54.3	$423,794	
Mulch Replacement	826	TON	$47.1	$38,943	
Seeding and Fertilizing	16,315	SY	$0.7	$10,931	
SUBTOTAL				$1,273,597	
Contingency (Scope and Bid)	30%			$382,079	20% Scope, 10% Bid (Lower end of the recommended range in EPA 540-R-00-002).
SUBTOTAL				$1,655,676	
Project Management	6%			$99,341	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
Construction Management	8%			$132,454	Percentage from Exhibit 5-8 in EPA 540-R-00-002 was used.
TOTAL PERIODIC COSTS				**$1,887,471**	

Notes:

Percentages used for contingency and professional/technical services costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Costs presented for this estimate are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.

Abbreviations:

DAY	Days
EA	Each
HR	Hours
LF	Linear Feet
LS	Lump Sum
SF	Square Feet
QTY	Quantity

Cost presented are expected to have accuracy +50% to -30% of actual costs, based on the scope presented.

Addendum No. 1 – Surface Water Technical Impracticability Evaluation
Evaluation of TI Data Set for Currency

Introduction

Preparation of the Butte Priority Soils Operable Unit (BPSOU) surface water technical impracticability evaluation (TI) report began in 2014. Surface water data available at that time were used in the analyses. Following preparation of the first draft, the document has undergone a series of reviews, followed by addressing and incorporating comments, and follow-up reviews and comments. The draft TI, dated November 2018, contains analyses based on data available in 2014; however, newer data are now available. Due to the extensive modeling conducted and a long review cycle, a significant effort would be required to incorporate the newer data. This technical memorandum evaluates and compares the available newer and older data to determine if the TI evaluation would produce different results and recommendations if the data are sufficiently different. The analyses are consistent with U.S. Environmental Protection Agency (EPA) guidance (*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance*. Office of Resource Conservation and Recovery. EPA 530/R-09-007. March).

Available Data

As part of the development of the TI, three categories of evaluations were conducted that used surface water data:

- Storm water stochastic modeling and effectiveness of various technical elements at attaining acute water quality criteria;
- Comparison of copper data to other metals; and
- Normal flow evaluations of technical elements at attaining chronic water quality criteria.

For the acute criteria evaluation, wet weather data collected at outfalls and in-stream during calendar years 2008 through 2013 plus data collected through June 2014 were used. For the chronic criteria evaluation, synoptic in-stream data collected during calendar years 2011 through 2013 were used. Data from 2008 through 2010 were omitted from the normal flow evaluation due to remedial actions resulting in changes to surface water quality identified in the *2008 to 2013 Surface Water Characterization Report* (EPA and Montana Department of Environmental Quality [MDEQ] 2017). If the TI were to be updated, the available data would include calendar years 2008 through 2017 for wet weather and 2011 through 2017 for normal high flow. These are compared to the data used in the TI.

Changes in Site Conditions

During the 2008 through 2018 data collection period, some remedial actions have been undertaken that may affect water quality. The *2008 to 2013 Surface Water Characterization Report* (EPA and

MDEQ 2017) listed pertinent remedial activities that occurred during the period covered by that report. These activities were well known at the time the initial draft of the TI evaluation was prepared.

Since 2014, remedial activities that may have affected surface water quality have been limited and include:

- 2014 to present – Routine cleanout of the BPSOU subdrain.
- 2014 and 2015 – Reclamation of the former wetland demonstration area north of the Metro Storm Drain (MSD) pump vault.
- 2014 and 2015 – Installation of a channel along Continental Drive to divert stormwater away from the MSD channel.
- 2015 – Upgrades to the MSD pump station, including a new discharge line, modification of dry vault piping, and localized construction dewatering.
- 2015 and 2016 – Lower Area One surface enhancements, which are not expected to affect surface water.
- 2016 and 2017 – Lexington Mine Reclamation.
- Varying degree of corrective actions at source area sites located on Butte Hill.

During the period of 2008 through 2017, the primary activities that could have affected surface water quality included:

- 2010 through 2014 – Storm sewer cleanout
- 2010 to current – Maintaining water levels in the wet pumping vault below the inflow pipe invert
- 2012 and 2013 – Storm sewer trunk line slip lining in the Buffalo Gulch drainage area
- 2013 and 2014 – Curb and gutter installation
- 2012 and 2013 – Installation of hydrodynamic devices in trunk lines in various drainages, including Warren Avenue, Buffalo Gulch, Anaconda Road, Texas Avenue, and Montana Street
- 2016 – Upgrades to the Metro Sewage Treatment Plant (STP), which affects station SS-07 and downstream but not any data used in the acute conditions part of the TI evaluation

Data Comparison

To determine if the data used in the TI evaluation are representative of current conditions, data were compiled and subjected to comparative statistical tests. The methodology followed to compile

the stormwater data used in the initial draft of the TI evaluation was reviewed and was generally as follows:

- Obtain available stormwater data from Atlantic Richfield database for the period of 2008 through June 2014 for total recoverable copper
- Add CDM Smith stormwater data from 2009
- Remove quality assurance sample results
- Convert nondetected values to blank values
- Calculate storm arithmetic average total recoverable concentrations

These procedures were applied to the current data set, including 2008 through 2017. There were no nondetected total copper results in the wet weather data.

For normal flow data, a similar procedure was used except that averaging was not used, the data were limited to normal high flow conditions, and the period was 2011 through 2013.

The total recoverable copper data were separated by location, including the outfall used in the model (MSD-3A and BG-01). Alias location names included MSD-CLV-3A and BG-CLV-01, but the locations were unchanged. In-stream locations included upstream station SS-04 under two flow conditions. At each station, data from each time period were compared to each other for significant differences using the two-sample t-test. The samples were logarithmically distributed; thus, the data were log-transformed prior to comparative testing. Results of the testing are presented in Table 1. The two-tailed significance (P-value) for differences at Buffalo Gulch is 0.16 and is 0.61 at upper Silver Bow Creek. At a confidence interval of 90 percent (alpha = 0.10), the differences are not significant.

Table 1 Two-Sample t-test Assuming Unequal Variables: Stormwater Outfalls

Statistic	Buffalo Gulch (BG-01 and BG-CLV-01		Upper Silver Bow Creek (MSD-3A and MSD-CLV-3A)	
	2008–2014	2008–2017	2008–2014	2008–2017
Mean of log-transformed data	6.06	5.84	5.34	5.28
Variance	1.43	1.34	0.69	0.69
Observations	100	160	66	119
Hypothesized mean difference	0		0	
Degrees of freedom	205		134	
t-statistic	1.41		0.51	
P(T<=t) one-tail	0.080		0.30	
t Critical one-tail	1.65		1.66	
P(T<=t) two-tail	0.16		0.61	

Statistic	Buffalo Gulch (BG-01 and BG-CLV-01		Upper Silver Bow Creek (MSD-3A and MSD-CLV-3A)	
	2008–2014	2008–2017	2008–2014	2008–2017
t Critical two-tail	1.97		1.98	
P < 0.10?	No. Accept null hypothesis		No. Accept null hypothesis	
Interpretation	Samples are not different		Samples are not different	

This comparison was also conducted on stormwater data from other outfalls not used in the modeling. In all cases, the difference was not significant at a 90 percent confidence interval.

In-stream data were used in the mixing model. Data from station SS-04 were mixed with stormwater data under two scenarios: wet weather conditions at SS-04 and normal high flow conditions at SS-04. Results of the two-sample t-test are shown in Table 2. Again, the difference was not significant at a 90 percent confidence interval.

Table 2 Two-Sample t-test Assuming Unequal Variables: SS-04

Statistic	SS-04 Wet Weather		SS-04 Normal High Flow	
	2008–2014	2008–2017	2008–2013	2008–2017
Mean of log-transformed data	3.52	3.52	1.60	1.70
Variance	1.11	0.92	0.22	0.21
Observations	66	97	26	50
Hypothesized mean difference	0		0	
Degrees of freedom	131		61	
t-statistic	0.01		-0.94	
P(T<=t) one-tail	0.50		0.18	
t Critical one-tail	1.66		1.68	
P(T<=t) two-tail	0.99		0.35	
t Critical two-tail	1.98		2.01	
P < 0.10?	No. Accept null hypothesis		No. Accept null hypothesis	
Interpretation	Samples are not different		Samples are not different	

The chronic conditions evaluation used in-stream data from stations SS-01, SS-05A, SS-06A, SS-06G, and SS-07. For normal high flow condition at SS-01 and SS-05A, results of the testing are presented in Table 3. The two-tailed significance (P-value) for differences at SS-01 is 0.44 and is 0.74 at SS-05A. At a confidence interval of 90percent (alpha = 0.10), the differences are not significant.

Table 3 Two-Sample t-test Assuming Unequal Variables: SS-01 and SS-05A

Statistic	SS-01		SS-05A	
	2011–2013	2011–2017	2011–2013	2011–2017
Mean	1.31	1.41	2.00	1.95
Variance	0.22	0.23	0.25	0.39
Observations	19	43	19	43
Hypothesized mean difference	0		0	
Degrees of freedom	35		43	
t-statistic	-0.77		0.34	
P(T<=t) one-tail	0.22		0.37	
t Critical one-tail	1.69		1.68	
P(T<=t) two-tail	0.44		0.74	
t Critical two-tail	2.03		2.02	
P < 0.10?	No. Accept null hypothesis		No. Accept null hypothesis	
Interpretation	Samples are not different		Samples are not different	

For normal high flow condition at SS-06A and SS-06G, results of the testing are presented in Table 4. The two-tailed significance (P-value) for differences at SS-06A is 0.10 and is 0.058 at SS-06G. At a confidence interval of 90 percent (alpha = 0.10), the differences at SS-06A and SS-05G are significant. These differences are not significant at a confidence interval of 95 percent.

Table 4 Two-Sample t-test Assuming Unequal Variables: SS-06A and SS-06G

Statistic	SS-06A		SS-06G	
	2011–2013	2011–2017	2011–2013	2011–2017
Mean of log-transformed data	1.89	2.09	1.92	2.13
Variance	0.21	0.18	0.15	0.15
Observations	19	43	19	43
Hypothesized mean difference	0		0	
Degrees of freedom	33		35	
t-statistic	-1.67		-1.96	
P(T<=t) one-tail	0.052		0.029	
t Critical one-tail	1.69		1.69	
P(T<=t) two-tail	0.10		0.058	
t Critical two-tail	2.03		2.03	
P < 0.10?	Yes. Reject null hypothesis		Yes. Reject null hypothesis	
Interpretation	Samples are different		Samples are different	

For normal high flow condition at SS-07, results of the testing are presented in Table 5. The two-tailed significance (P-value) for differences at SS-07 is 0.82. At a confidence interval of 90 percent (alpha = 0.10), the difference is not significant.

Table 5 Two-Sample t-test Assuming Unequal Variables: SS-07

Statistic	SS-07	
	2011–2013	2011–2017
Mean of log-transformed data	2.43	2.45
Variance	0.06	0.09
Observations	19	43
Hypothesized mean difference	0	
Degrees of freedom	40	
t-statistic	-0.23	
P(T<=t) one-tail	0.41	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.82	
t Critical two-tail	2.02	
P < 0.10?	No. Accept null hypothesis	
Interpretation	Samples are not different	

Because the samples were different for SS-06A and SS-06G, the calculations in Table 7-4 of the TI evaluation report were recalculated for the period 2011 through 2017 and are shown in Table 6. For SS-06A at normal high flow, the new baseline median was 8.7 micrograms per liter (µg/L) and 16 exceedances per 7 years or 6.9 per 3 years. The predicted median was 4.9 µg/L with one exceedance per 7 years or 0.4 per 3 years. Two exceedance rates are included: the simple comparison of the concentration to the standard and the simple comparison plus comparison to upstream. The upstream comparison adds that the sample has to exceed both the upstream concentration and the standard to be considered an exceedance. This comparison to upstream removed several of the simple exceedances.

For SS-06G at normal high flow, the new baseline median was 8.8 µg/L and nine exceedances per 7 years or 3.9 per 3 years. The predicted median was 4.6 µg/L with zero exceedances per 7 years or zero per 3 years. The predicted exceedance rates at SS-06A and S-06G are unchanged from Table 7-4 of the TI evaluation report.

Conditions at SS-07 are significantly different due to improvements in the effluent from the Metro STP. As such, previous assumptions of meeting the discharge permit requirements are superseded by actual data, and Table 6 reflects conditions in 2016 and 2017 following implementation of the improvements. This is an improvement from the predictions in Table 7-4.

Table 6 Revised Predicted Chronic Copper Criteria Exceedances following Sediment Removal based on 2011 or 2012 to 2017 Data

Station	Normal High Flow Conditions 2011–2017				Base Flow 2012–2017	Both Conditions
	Baseline Median Total Recoverable Copper (µg/L)	Baseline Exceedances per 3 years[1]	Predicted Median Total Recoverable Copper (µg/L)	Predicted Exceedances per 3 Years[1]	Predicted Exceedances per 3 Years[1]	Total Chronic Exceedances per 3 Years[1]
SS-01	4.1	0.4	4.1	0.4	0	0.4
SS-05A	7.2	4.3/3.4	3.5	1.3/0.4	0/0	1.3/0.4
SS-06A	8.7	6.9/6.4	4.9	0.4/0	0.5/0.5	0.9/0.5
SS-06G	8.8	3.9/3.9	4.6	0/0	0/0	0/0
SS-07[2]	8.6	4.5/4.5	6.5	0/0	0/0	0/0

[1] Exceedances include without upstream comparison/with upstream comparison

[2] Due to significant changes in Metro STP effluent, SS-07 is limited to 2016–2017.

For base flow conditions, the same comparisons were made. No base flow sampling events occurred in 2011 because it was a high runoff year; therefore, the TI used data from 2012 and 2013 for base flow. Based on the t-test results comparing the 2012 through 2013 data to 2012 through 2017 data, stations SS-01, SS-05A, and SS-06G are not different. Station SS-06A is statistically different. Because Metro STP effluent is a large portion of base flow, as expected, SS-07 is different using more recent data. Because of the differences at SS-06A and SS-07, the predicted exceedance rates were updated and added to Table 6. The base flow exceedance rate decreased for SS-06A and SS07 from those presented in Table 7-4.

The total exceedance rate results in Table 6 are slightly lower than that presented in Table 7-4 of the TI evaluation report for four of the stations. SS-07 is significantly lower, changing the total exceedance rate from eight per 3 years to zero per 3 years. Because no waivers were recommended by the TI, the updated results do not change the conclusions of the TI evaluation for copper.

Stormwater Copper Concentration Correlations to Other Metals

The TI evaluation used total recoverable copper results in the modeling and analysis for the acute conditions evaluation. The results were applied to other contaminants of concern, including cadmium, lead, and zinc, based on similarities in the data sets. The similarities were based on a correlation analysis, which indicated that these other metals correlated with copper, with a correlation coefficient of 0.81 for cadmium, 0.87 for lead, and 0.86 for zinc. The silver was less well-correlated, with a correlation coefficient of 0.66. This was presented on Figure 6-4.

The data used in these correlations were 2008 through 2013. To see if newer data were more or less well correlated, the analysis was repeated using data from 2008 through 2017, which resulted in approximately twice as many results. The silver data have several nondetected results and results qualified as estimated (J), which is expected with data near the reporting limit.

The updated correlations using metals data from 2008 through 2017 are shown on Figure 1. Generally, the correlations coefficients (R^2) improved for cadmium, lead, and zinc. Silver was slightly less well correlated.

Because of the frequency of estimated silver values, the analysis was conducted using only unqualified data. This removed most low concentration results and resulted in a higher correlation coefficient of 0.72. The other metals had a low frequency of qualified data, but the correlation was run removing all qualified data for all metals. The results are shown on Figure 1 and summarized in Table 7.

Table 7 Summary of Correlation Coefficients (R^2) of Copper to Other Metals based on 2008 to 2017 Data

Metals Correlated	Figure 6-4 in TI Evaluation	2008–2017 with Nondetected Silver Filtered Out	2008–2017 with All Qualified Data Filtered Out
Copper and cadmium	0.81	0.86	0.86
Copper and lead	0.87	0.90	0.89
Copper and silver	0.66	0.64	0.72
Copper and zinc	0.86	0.88	0.88

Summary

Data sets used in the acute conditions TI evaluation were not significantly different from the currently available data at a confidence interval of 90 percent. If the modeling were to be repeated with the new data, it is anticipated that the results would also not be significantly different at a confidence interval of 90 percent.

For the chronic conditions evaluation, data were slightly different for two locations using the normal flow data. The predictive analysis was repeated using the newer data, and the predicted exceedance rates are unchanged to lower.

Correlations between copper and other metals were recalculated using newer data. The correlations were slightly improved, indicating that applying the results of copper modeling and analysis to the other metals as described in the TI evaluation is still appropriate.

The TI evaluation concluded that total recoverable copper and total recoverable zinc would not be attained by implementation of the technical elements evaluated. It is anticipated that this conclusion would be unchanged if the newer data were incorporated into the evaluation. All other conclusions would also be unchanged if the newer data were to be used in the evaluation.